

TITLE:

# A two-state model of simple reaction time( Dissertation\_全文 )

AUTHOR(S):

Okamoto, Yasuharu

CITATION:

Okamoto, Yasuharu. A two-state model of simple reaction time. 京都大学, 1983, 文学博士

**ISSUE DATE:** 1983-03-23

URL: https://doi.org/10.14989/doctor.r4887







# A TWO-STATE MODEL

# OF

# SIMPLE REACTION TIME

Yasuharu Okamoto

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#### SIMPLE REACTION TIME

by

### YASUHARU OKAMOTO

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Kyoto University, JAPAN

1982

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CHAPTER I

### INTRODUCTION

When a stimulus is presented, the subject responds to it with some delay. This delay is called a reaction time(abbreviated as RT). RTs are classified into two types, simple RTs and choice RTs. When the subject responds to one of possible stimuli in one of more than two ways according to the stimulus presented, the RTs are called choice RTs. If there is only one stimulus and only one type of response is required, the RTs are called simple RTs. The interval from the start of the trial to the presentation of the stimulus is called foreperiod(abbreviated as FP).

In this article, a new model of simple reaction time is proposed. To appreciate the necessity of a new model, it is useful to review models not only for simple RT, but also for choice RT. First, let us review literatures on models for choice RT.

#### MODELS FOR CHOICE REACTION TIME

#### A. Choice Reaction Time and The Number of Stimuli.

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The following empirical relations between choice RT and the number of stimuli are well known(cf.,Welford(1960,1980)),

$$\overline{RT} = K \cdot \log(n+1) \tag{1-1}$$

and

$$\overline{RT} = a + b \cdot \log \eta \tag{1-2}$$

where  $\overline{RT}$  and n are the mean choice reaction time and the number of stimuli, respectively. Welford(1960,1980) explained that eqs.(1-1) and (1-2) were proposed by Hick(Hick(1952), cited in Welford(1960,1980)) and Hyman(1953), respectively. If the event that no signal is presented is conceived of as one of possible signals, eq.(1-1) means that mean RT is proportional to the uncertainty of choice situation. As to eq.(1-2), when we set n=1,  $\overline{RT}=a+b\cdot\log n=a$ . That is, a is the mean simple reaction time.  $b\cdot\log n$  represents the increase over the simple RT due to the need for identification and choice. x bits of uncertainty means that we can identify the specific event by x steps of dichotomization process. Welford(1960) explained that Hick(1952) examined a serial dichotomous classification model. According to Smith(1977,1980), low stimulus intensities should give a better fit against  $\log n$  (eq.(1-2)), while high intensities should be better fitted against  $\log(n+1)$  (eq.(1-1)) (cf. the next section).

#### B. Stimulus-Response Compatibility.

Smith(1977,1980) proposed the model which incorporated stimulus-response compatibility.

The onset of the stimulus, j, induces the following excitations.  $e(j) = q + \frac{u}{N}$  $e(i) = \frac{u}{N}$   $i \neq j$ .

These stimulus-excitations,  $\rho(i)$ 's, are transformed into response excitations,  $\rho(i)$ . At cycle s of this transformation, the increment in  $\rho(i)$  is  $\frac{e(i)}{N}$ , and the time required for this cycle is  $\frac{\sum \alpha(i) \cdot e(i)}{5}$ .  $\alpha(i)$  is the parameter which represents the stimulus-response compatibility for stimulus, i. Let  $\delta(m)$  be the response m's criterion, and x be the cycle time at which  $\rho(m)$  reaches  $\delta(m)$ , then,

$$\rho(m) = \int_{1}^{\infty} \frac{e(j)}{N} ds = \frac{e(j)}{N} (\chi - 1)$$

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Therefore

$$\chi = \frac{\delta(m) \cdot N}{e(j)} + 1$$

$$(1-3)$$

The mean reaction time of the response m to the stimulus j,

RT(j), is the sum of the integral of the x cycle duration,  $\int_{1}^{\chi} \frac{\sum \alpha(i) \cdot e(i)}{5} d5$ , and any non-processing delays, a.

$$RT(j) = a + \int_{1}^{\Lambda} \frac{\sum \alpha(i) \cdot e(i)}{s} ds$$
  
=  $a + (\sum \alpha(i) \cdot e(i)) \cdot \log \chi$   
=  $a + (\sum \alpha(i) \cdot e(i)) \cdot \log (\frac{\delta(m) \cdot N}{e(j)} + 1)$  (by eq.(1-3))  
=  $A + B \cdot \log (N + \frac{e(j)}{\delta(m)})$  (1-4)

where

$$A = \alpha + (\Sigma \alpha(i) \cdot e(i)) \cdot \log \frac{\delta(m)}{e(j)}$$

-v

and

Eq.(1-4) includes eqs.(1-1) and (1-2) as special versions for  $\frac{C(j)}{\delta(m)} = 1$  or 0, respectively.

Laming(1966) used the following approximation

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$$\log(n+1) \stackrel{\text{n+1}}{=} \sum_{r=1}^{n+1} \frac{1}{r}$$

and generalized eq.(1-1) as follows,

$$RT = a + b \cdot \sum_{r=1}^{n} \frac{1}{r+k}$$
 (1-5)

Laming(1966) proposed two models, which predicted that the mean RT follows eq.(1-5).

The first model is extended version of the model proposed by Christie and Luce(Christie and Luce(1956), cited in Laming(1966)).

According to this type of model, the reaction time,  $t_n$ , to one of n equiprobable signals is determined by the longest of n elementary decision processes. Let F(t) be the distribution function of this elementary decision latency, then

$$RT = E(t_n) = \int_0^\infty t \cdot d(F(t)^n)$$
 (1-6)

Laming(1966) solved eq.(1-6) with respect to F(t) in order that RT satisfies eq.(1-5). Let F(t)=y and  $t = \phi(y)$ , then the solution is given by the following equation;

$$\phi(y) = \int \frac{b \cdot y^k}{1 - y} \cdot dy + C$$

For k=0,

 $F(t) = / - e^{-\lambda (t-a)}$ 

This is Christie and Luce(1956)'s version.

The second model proposed by Laming(1966) is an analogy to an epidemic model. With the assumption that the rate of interactions involving a given individual is constant  $\lambda$ , and independent of the size of the group, i.e., the number of equiprobable stimuli, he derived the following equation;

$$RT = \frac{2 \cdot (n - 1)}{n \lambda} \cdot \sum_{r=1}^{n-1} \frac{1}{r}$$

#### D. Fast Guess Model.

In the fast guess model(Ollman(1966), Yellott(1967,1971)), there are two types of responses, guess responses and stimulus controlled responses. On any trial, the subject makes either a guess response with probability 1-q, or a stimulus controlled response with probability q. When the subject guesses, he makes response  $A_i(i=1,2)$  with bias probability  $b_i$  regardless of which stimulus ( $S_1$  or  $S_2$ ) was presented. When the subject makes a stimulus controlled response, the response is correct with probability a > .5.

From these assumptions, Yellott(1971) derived the following equation;

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$$\frac{\mathbf{p}_{c} \cdot \mathbf{M}_{c} - \mathbf{p}_{e} \cdot \mathbf{M}_{e}}{\mathbf{p}_{c} - \mathbf{p}_{e}} = \text{constant.}$$
(1-7)

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where  $p_c$  and  $p_e$  are the probabilities of correct and error responses, respectively, and  $M_c$  and  $M_e$  are the mean reaction times of correct and error responses, respectively. Eq.(1-7) was supported by the experimental results reported in Ollman(1966) and Yellott(1967,1971).

Yellott(1971) proposed a deadline model, which does not always predict the constancy of the left side of eq.(1-7). The deadline model assumes that on every trial, information about the identity of the choice stimulus takes the form of a single quantum which arrives  $\underline{S}$  msec after stimulus onset.  $\underline{S}$  has the distribution function S(t) and density function s(t). If the subject waits until the arrival of the information quantum, and then responds, his response is correct with probability one. On each trial, however, the subject presets a deadline  $\underline{D}$ . If the information quantum has not arrived  $\underline{D}$  msec after stimulus onset, the subject guesses with some bias probabilities  $b_1$  and  $b_2$ for responses  $r_1$  and  $r_2$ .  $\underline{D}$  has the distribution function D(t) and density function d(t).

From these assumptions, Yellott(1971) derived the following equation;

$$\frac{\mathbf{p}_{c} \cdot \mathbf{M}_{c} - \mathbf{p}_{e} \cdot \mathbf{M}_{e}}{\mathbf{p}_{c} - \mathbf{p}_{e}} = \frac{\int_{a}^{\infty} \mathbf{t} \cdot \mathbf{s}(\mathbf{t}) \cdot (1 - \mathbf{D}(\mathbf{t})) \cdot d\mathbf{t}}{\int_{a}^{\infty} \mathbf{s}(\mathbf{t}) \cdot (1 - \mathbf{D}(\mathbf{t})) \cdot d\mathbf{t}}$$
(1-8)

The right side of eq.(1-8) is not in general invariant under arbitrary transformations of D(x). But, a special version of the deadline model yields the identical prediction of the fast guess model with a=1. That is, the deadline model can explain the constancy of the left side of eq.(1-7), too.

As to the speed-accuracy tradeoff, the fast guess model asserts that the error rate should be constant in order that the experimenter can controll the subject's strategy. In the fast guess model, the speed-accuracy tradeoff is controlled by the probability of guessing. Equality of the error rates between the experimental conditions means equality of the guessing probabilities between them. However, according to Ollman(1977)'s adjustable timing model, invariance of the error rate does not assure invariance of the strategy.

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In the adjustable timing model, the joint density of the type and latency of the responses, f(r,t), is expressed as the product of two probabilities;

 $f(r,t) = A(r|t) \cdot f(t)$ 

where A(r|t) is the conditional probability that the response is the specified type(r = correct response or error), given the particular value of RT(RT=t), and f(t) is the marginal probability of the RT. Ollman(1977) insists that A(r|t) is specified only by the task and f(t) is dependent only on the subject's strategy. Hence, in order to assure the invariance of the speed-accuracy tradeoff, the experimenter should control the reaction time, rather than the error rate.

#### E. Accumulation Model.

Random walk models(Stone(1960), Laming(1962,1968), Link and Heath(1975), Link(1975,1978), Thomas(1975), Swensson and Green(1977)) assumes that the subject accumulates information from periodic samples of the sensory input and responds when this accumulation reaches one of decision boundaries. Link and Heath(1975) derived the following equation;

$$E_{A} - E_{B} = \frac{D}{A} \left( \frac{C-I}{C} \right)$$
(1-9)

In eq.(1-9),  $E_A$  and  $E_B$  are the expected numbers of steps to the boundaries for responses, A and B. D is the absolute value of the boundary positions.  $\mu$  and c are determined by the distribution function of sample values. If the distribution function of sample values is normal or trinomial, c=1. In this case,  $E_A = E_B$  from eq.(1-9). This means that the mean latency of the correct response is equal to the one of the error. But, if the distribution function of sample values is a Laplace distribution, i.e., difference between two exponential distributions,  $c \neq 1$  in general. In this case,  $E_A \neq E_B$ , which means that the mean latency of the correct response is not equal to the mean latency of the error.

Kintsch(1963)'s model adopts a stochastic mechanism of random walk, although it is not an accumulation model. His model is described by the following equation;

S οA oВ Α В 0 1-a S 0 0 а 0 οA 0 1-b Ъ 0 1-c Q = OB0 0 0 (1-10)с 0 1 0 0 А 0 1 В 0 0 0 0

On each trial the subject begins in the starting state,S, goes to one or the other orienting state( oA or oB ), and from there, he either goes on to make the recorded response( A or B ) or shifts to the other orienting state( oB or oA ). Furthermore, Kintsch(1963) assumes that the time required to complete each transition step is the discrete random variable which follows the geometric distribution,eq.(1-11);

 $P(k) = p^{k-1} \cdot (1-p)$  (1-11)

From eqs.(1-10) and (1-11), the mean latency of responses for the case b=c can be derived;

The mean latency =  $\frac{(1+b)\cdot p}{b\cdot(1-p)}$ 

In the recruitment theory proposed by LaBerge(1962), the accumulation process is determined by sampling by replacement. This model assumes that there are three types of elements, $C_1$ ,  $C_2$ 

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and  $C_0$ .  $C_1$  and  $C_2$  elements are connected to responses  $A_1$  and  $A_2$ , respectively.  $C_0$  elements are connected to no response alternatives. The subject chooses response  $A_1$ , when he draws  $r_1$  elements of type  $C_1$  while the number of drawings of type  $C_2$  elements, x, is less than  $r_2$ , where  $r_1$  and  $r_2$  are criterions for responses  $A_1$  and  $A_2$ . With these assumptions, LaBerge(1962) derived the following equation;

The average number of total draws( the mean latency )  $=\frac{r_1 \cdot I_{P_1}/(p_1 + p_2)(r_1 + l_1, r_2)}{p_1 \cdot I_{P_1}/(p_1 + p_2)(r_1, r_2)}$ 

where  $p_1$  and  $p_2$  are the proportions of elements of types  $C_1$  and  $C_2$ , and

$$I_{s}(t,u) = \sum_{\substack{k=0 \\ k=0}}^{\frac{u-1}{(t+k-1)!}} \cdot 5^{t} (1-5)^{k}$$

The variable criterion theory proposed by Grice et al.

(Grice, Nullmeyer and Spiker(1977), Grice, Spiker and Nullmeyer (1979), Grice and Spiker(1979), also cf.,Link(1979)) assumes that the accumulation process is deterministic, but the decision criterion is random. The probabilistic character of the decision process is attributed to the random fluctuation of the decision criterion. According to the variable criterion theory, the excitatory strengths of the correct response and the error at time t,  $f_{c}(t)$  and  $f_{e}(t)$ , can be described as follows;

$$f_{c}(t) = V(t) + A(t)$$
  

$$f_{e}(t) = E_{c}(t) - I(t) - A_{D}(t)$$
  

$$= (V(t) - I(t)) + (A(t) - A_{D}(t))$$
(1-12)

where V(t) is the value of the sensory detection component, A(t) is associative strength of the correct stimulus, I(t) is associative inhibition, and  $A_D(t)$  is associative discrimination. If  $f_c(t)$  (or  $f_e(t)$ ) reaches the criterion C before  $f_e(t)$  (or  $f_c(t)$ ) reaches its criterion, the correct response (or the error) occurs. Eq.(1-12) means that the sensory and associative components, V(t) and A(t), are suppressed by the associative inhibition I(t) and the associative discrimination  $A_D(t)$ , respectively.

#### F. Timing and Counting Models.

Green and Luce(1974) examined timing and counting models for two-choice reaction time data. According to these models, the decision is made on the base of the estimation of the rate of neural pulses. For the estimation, the timing model uses the inter-arrival-intervals of pulses and the counting model uses the number of pulses during a fixed time interval. For these models, Green and Luce(1974) derived the following equations for the mean two-choice reaction times for auditory stimuli; For the timing model,

$$MRT_{1} = \left(\frac{M_{I}}{M_{2}}\right) \cdot MRT_{2} - \overline{r} \cdot \left(\frac{M_{I}}{M_{2}} - I\right)$$

$$P_{c} \cdot MRT_{c} - P_{e} \cdot MRT_{e}$$

$$= \overline{r} \cdot (p_{c} - p_{e}) + \mathcal{R}(J, k, \sigma) \cdot \left\{M_{I} \cdot [P(1|1) - \frac{1}{2}] + M_{2} \cdot [P(2|2) - \frac{1}{2}]\right\}$$

$$(1-14)$$

For the counting model,

$$MRT_1 = MRT_2 = \bar{r} + 0^-$$
 (1-15)

$$p_{c} \cdot MRT_{c} - p_{e} \cdot MRT_{e} = (\overline{r} + \delta)(\mathcal{P}_{c} - \mathcal{P}_{e})$$
(1-16)

In the above equations,  $MRT_1$  and  $MRT_2$  are the mean reaction times for the two stimuli,  $S_1$  and  $S_2$ ,  $MRT_c$  and  $MRT_e$  are the mean reaction times of the correct responses and errors, and  $p_c$  and  $p_e$  are the probabilities of the correct responses and errors. Eq.(1-13) means that  $MRT_1$  is a linear function of  $MRT_2$ . Eq.(1-14) means that  $p_c MRT_c - p_e MRT_e$  is an approximately linear function of  $p_c - p_e$  when intense stimuli are used, but the former is an accelerated function of the latter when weak signals are used. The meaning of eq.(1-15) is obvious. According to eq.(1-16),  $p_c \cdot MRT_c - p_e \cdot MRT_c$  is an accelerated function of  $p_c - p_e$ , because  $p_c - p_e$  increase with  $\delta$ . Green and Luce(1974) concluded that the timing model is generally more plausible except in situations when it is distinctly to the subject's advantage to employ the counting mechanism.

#### G. Preparation Model.

Falmagne(1965)(also cf.,Falmagne(1968), Theios and Smith (1972), Lupker and Theios(1977)) proposed a two-state model. According to this two-state model, the subject is either prepared or unprepared for each possible stimulus on any trial. If the subject is prepared (or unprepared) for the stimulus to be presented, his latency is shorter (or longer). The probability of the preparation for a particular stimulus depends on the events on the previous trial. From these assumptions, Falmagne(1965) derived many equations, which describe the sequential effects or

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the effects of the probabilities of the possible stimuli.

For example;

$$E(X_{i,n+1}) = (1 - c) \cdot E(X_{i,n}) + c \cdot E(X_k)$$
 if  $E_{i,n} = 1$  (1-17)

and

$$E(X_{i}) = \frac{\pi i \cdot C \cdot E(X_{k}) + (1 - \pi i) \cdot C' \cdot E(X_{\overline{k}})}{\pi i \cdot C + (1 - \pi i) \cdot C'}$$
(1-18)

Eq.(1-17) describes the relation between the mean reaction times on trials n and n+1,  $E(X_{i,n})$  and  $E(X_{i,n+1})$ , if stimulus i is presented on trial n ( $E_{i,n} = 1$ ). Eq.(1-18) describes the relation between the mean reaction time for stimulus i,  $E(X_i)$ , and the probability of presentation of stimulus i,  $\mathcal{T}_i$ .

In some article (Falmagne and Theios(1969), Theios(1973), Falmagne, Cohen and Dwivedi(1975), Lupker and Theios(1975)), the preparedness of the subject is interpreted in terms of the process of memory scan. According to these interpretations, the preparedness for a particular stimulus means that the prototype of this stimulus is in short term memory, so is easily processed. Since the capacity of this short term memory is limited, prototypes of some stimuli cannot be in this short term memory and the processing of these stimuli needs more time.

#### \* \* \* \* \* \* \*

Many models have been proposed, each of which emphasizes a different aspect of choice reaction time. To the author, Falmagne(1965)'s two-state model is most interesting because of the following two reasons;

1). It has very simple structure, i.e., it assumes only two states. Comparing two-state, three-state and four-state models, Lupker and Theios(1975) concluded that the two-state model could be accepted, but the three-state and four-state models could be rejected. That is, the model with the smallest number of states was the best.

2). The two-state model is a discrete one. The question whether psychological states are discrete or continuous is one of fundamental problems. But, to determine experimentally whether the state is discrete or not is difficult, because the prediction made by a particular model is also dependent on the assumptions other than the one to test. The author is interested in the question how well models with discrete states can do.

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Now, let us review literatures on models for simple reaction times.

#### MODELS FOR SIMPLE REACTION TIMES

#### A. Time Uncertainty and Simple Reaction Times.

Klemmer(1957) obtained the following equation for the pooled data;

$$RT = .018 \cdot \log_{10} \nabla_T + .235 \tag{1-19}$$

where RT is the mean simple reaction time and  $\mathcal{O}_{T}$  is the measure of total time uncertainty, i.e., the standard deviation derived from adding variances from foreperiod and time-prediction distributions. According to Klemmer(1957), eq.(1-19) means that the averaged speed of information processing in simple reaction task is 18 msec per bit.

#### B. Thomas(1967)'s Anticipation Model.

Thomas(1967) proposed the model in which the state of readiness plays a central role. He assumed that, if T is the

subject's estimate of t at which the signal will be presented, the subject's state of readiness, SR, would rise to a local maximum proportional to p<sub>t</sub>(the conditional probability that the signal would arrive at t given that it has not arrived before t) at T, and then decline. The following equation was proposed as an approximation,

$$SR(z) = \ell \cdot p_t - m \cdot |z - T| \qquad (1-20)$$

where  $\ell$  and m are positive constants.

The reaction time, RT<sub>t</sub>, was assumed to obey the following equation,

$$RT_{t} = \begin{cases} f(SR(t)) & (0 < p_{t} \leq p_{x}) \\ RT_{m} & (p_{t} \geq p_{x}) \end{cases}$$
(1-21)

where

$$f(x) = a + \frac{b}{x}$$

and  $p_x$  is a some constant.

If the foreperiod distribution was uniform on the integers 1 to n, then,

$$P_{t} = \frac{\frac{1}{n}}{1 - (t - 1) \cdot \frac{1}{n}}$$
  
=  $(n - t + 1)^{-1}$ ,  $t = 1, 2, \cdots, n$  (1-22)

Suppose that the signal arrives at time i.d; then the subject has to predict each of the time-point t.d, t=1,2,...,i. It is assumed that the subject predicts one-point starting from the previous one, so that for each prediction the subject predicts an interval of length d and does so with an error  $\mathcal{E}$ . It is also assumed that  $\mathcal{E}$  is N(0, $\sigma^2$ ). Then the error, $\mathcal{E}_i$ , in predicting the interval of length i.d is N(0, $i\sigma^2$ ). Then, from eqs.(1-20),(1-21) and (1-22),

$$RT_{i} = a + b \cdot E\left(\frac{1}{p_{i} - m \cdot |\mathcal{E}_{i}|}\right)$$
  
$$\Rightarrow a + b \cdot (n - i + 1) + b \cdot g \cdot (n - i + 1)^{2} \cdot \sqrt{i}$$

where  $g = m \cdot v \cdot \sqrt{\frac{2}{\pi}}$ , and RT<sub>i</sub> is the mean reaction time for foreperiod = i \cdot d.

#### C. Deadline Model.

A deadline model(Ollman and Billington(1972), Kornblum(1973)) assumes that in a simple reaction task the two processes, the signal detection and time estimation processes, race and a faster one determines a reaction time. Let  $T_c$  and  $T_d$  be the random variables which represent the time of the deadline and the time at which the signal detection may occur. Then, the measured overt response time, T, is given by

$$T = \min(T_c, T_d)$$

Hence,

$$(1 - F(t)) = (1 - F_o(t)) \cdot (1 - F_d(t))$$

where  $F(t) = P(T \leq t)$  and so on.

From the above equation,

$$F_{d}(t) = \frac{F(t) - F_{c}(t)}{1 - F_{c}(t)}$$
(1-23)

F(t) is the cumulative distribution of the observed response times, and  $F_c(t)$  is given by the response times on the trials where no signal occurred. By eq.(1-23), we can estimate the true reaction time distribution, $F_d(t)$ , using F(t) and  $F_c(t)$ .

#### D. Recruitment Model.

Recruitment model(LaBerge(1962)) assumes that there are two types of elements,  $C_1$  and  $C_0$ . The elements of type  $C_1$  are connected to the response, but the elements of type  $C_0$  are connected to no responses. The evocation of the response involves the sampling of r elements of type  $C_1$  plus w neutral elements. That is, r is the decision boundary for the response. If m elements must be drawn to obtain the rth conditional element, then the latency is given as,

$$latency = \lambda \cdot m + t_0 \tag{1-24}$$

where  $\lambda$  is the time required for sampling one element, and t<sub>0</sub> is the residual latency. If m = r + w, and the proportions of the elements of types C<sub>0</sub> and C<sub>1</sub> are p<sub>0</sub> and p<sub>1</sub>, respectively, then,  $P(r+w) = \frac{(r+w-1)!}{(r-1)! \cdot w!} \cdot p_1^r \cdot p_0^w$  (1-25)

Hence, from eqs.(1-24) and (1-25),

the mean latency =  $\lambda \cdot E(r + w) + t_0$ 

$$= \lambda \left( \frac{r}{p_1} \right) + t_0 \tag{1-26}$$

Eq.(1-26) means that, if  $p_1$  is an increasing function of the stimulus intensity, then the mean latency is a decreasing function of the stimulus intensity.

#### E. Variable Criterion Model.

Variable criterion model(Grice(1968,1972), Grice,Nullmeyer and Spiker(1977)) assumes that the accumulation process is deterministic, but the criterion is randomly varying. The basic formula is given as

f(t) = H(t) + V(t)

where f(t), H(t) and V(t) are the excitatory strength, the associative strength and the sensory component at time t. The response occurs when the excitatory strength f(t) reaches the criterion T. The criterion T is assumed to be normally distributed. Grice(1977) determined the forms of the functions H(t) and V(t)from the experimental data. The H(t)s were fitted with Gompertz growth functions,  $H(t)=a \cdot b^{c^{t}}$  and the V(t)s were fitted with exponential growth functions,  $V(t)=a - b \cdot e^{-c \cdot t}$ .

#### F. Temporal Integration Model.

Hildreth(1973) proposed a temporal integration model of simple reaction time to brief visual stimuli. This model assumes that detection time, $T_d$ , is the time required for the time integral of a nonnegative function, $v(t;d,\ell)$ , called the visual response function, to reach some fixed criterion,c. The parameters, d and  $\ell$ , represent the duration and luminance of the presented stimulus. The form of  $v(t;d,\ell)$  for a square-wave flash is assumed to be given as,

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$$\mathbf{v}(\mathbf{t};\mathbf{d},\boldsymbol{\ell}) = \begin{cases} 0 & \text{for } \mathbf{t} \leq \boldsymbol{\ell}_{\boldsymbol{\ell}} \\ \lambda_{\boldsymbol{\ell}} & \text{for } \boldsymbol{\ell} \leq \boldsymbol{\ell} \end{cases}$$

$$\begin{array}{l} \lambda_{\boldsymbol{\ell}} & \text{for } \boldsymbol{\ell} \leq \boldsymbol{\ell} \\ \lambda_{\boldsymbol{\ell}} & \boldsymbol{\ell} & \boldsymbol{\ell} \end{cases}$$

$$\begin{array}{l} \lambda_{\boldsymbol{\ell}} & \boldsymbol{\ell} & \boldsymbol{\ell} \end{cases}$$

$$\begin{array}{l} \lambda_{\boldsymbol{\ell}} & \boldsymbol{\ell} & \boldsymbol{\ell} \\ \lambda_{\boldsymbol{\ell}} & \boldsymbol{\ell} & \boldsymbol{\ell} & \boldsymbol{\ell} \end{cases}$$

$$\begin{array}{l} \lambda_{\boldsymbol{\ell}} & \boldsymbol{\ell} & \boldsymbol{\ell} \\ \lambda_{\boldsymbol{\ell}} & \boldsymbol{\ell} & \boldsymbol{\ell} & \boldsymbol{\ell} \end{cases}$$

That is, the visual response function  $v(t;d,\ell)$  corresponding to a square-wave flash with intensity  $\ell$  and duration d begins as a square-wave with amplitude  $\lambda_{\ell}$  at  $t = e_{\ell}$ , is maintained until time d, and then decays exponentially following offset of the flash.

Then,

$$V(t;d,\ell) = \int_{0}^{t} v(t) \cdot dt$$

$$= \begin{cases} 0 & t \le e_{\ell} \\ \lambda_{\ell} \cdot (t - e_{\ell}) & e_{\ell} < t \le d \\ \lambda_{\ell} \cdot (d - e_{\ell}) + \frac{\lambda_{\ell}}{Y_{\ell}} \cdot (1 - e^{-Y_{\ell} \cdot (t - d)}) & d < t \end{cases}$$

and

$$V(T_d; d, \ell) = c \tag{1-29}$$

From eqs.(1-27),(1-28) and (1-29), we get the detection

time,  $\mathbf{T}_{\mathbf{d}}$ , as the function of d,

$$T_{d} = \begin{cases} \infty (no \ detection) & d \leq \delta l \\ d - \frac{l}{F_{\ell}} \cdot log(F_{\ell}(d - \delta_{\ell})) & \delta_{\ell} < d < T_{\ell} = \delta_{\ell} + \frac{1}{V_{\ell}} \\ \delta_{\ell} + \frac{l}{F_{\ell}} = T_{\ell} & T_{\ell} \leq d \end{cases}$$

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where  $\delta_{\!\ell}$  and  $\gamma_{\!\ell}$  satisfy the following equations,

$$V(\infty; \delta_{\ell}, \ell) = c$$

and

$$V(\mathcal{T}_{\boldsymbol{i}};\mathcal{T}_{\boldsymbol{i}},\boldsymbol{\ell}) = c.$$

That is,  $\int_{\mathcal{U}}$  is the shortest duration for which a flash with intensity  $\ell$  is above threshold, and  $\mathcal{T}_{\ell}$  is the shortest duration for which V(d;d,  $\ell$ )>c.

#### G. Timing and Counting Models.

According to the timing model(Luce and Green(1972), Green and Luce(1974)), inter-arrival-intervals, IAIs, of the pulses of sensory information is monitored, and the subject responds when the IAI is shorter than the criterion,  $\beta$ , which suggests that the reaction signal has been presented. The train of the pulses is assumed to obey a Poisson process. The following equation is one of the equations derived by Luce and Green(1972) with the assumption that the mean magnitude estimation, ME, is proportional to M, the parameter of the Poisson process when the signal is presented, i.e., ME =  $D_{M}$ ;

the mean 
$$RT \doteq \overline{r} + \begin{pmatrix} \frac{2D}{ME} & \text{for } \mathcal{M} \text{ large} \\ \\ \frac{D}{ME} + \frac{D^2}{ME^2 \beta} & \text{for } \mathcal{M} \text{ small} \end{pmatrix}$$

The poisson counting model proposed by Hildreth(1979) is a stochastic version of the temporal integration model proposed by Hildreth(1973). According to this counting model, the onset of the stimulus with intensity  $\mathcal{L}$  activates N<sub>L</sub> parallel Poisson processes with intensity parameter  $r_{l}$ . After the offset of the stimulus with duration d, each of the N<sub>L</sub> Poisson processes is left with exactly one more pulse to deliver to the detection center. The subject responds when the Kth pulse arrives at the detection center. Hildreth(1979) derived the following equation;

 $E(W_{K,\ell} | \text{detection})$   $= P(W_{K,\ell} \leq d) \cdot E(W_{K,\ell} | W_{K,\ell} \leq d)$   $+ P(d < W_{K,\ell} < \infty) \cdot E(W_{K,\ell} | d < W_{K,\ell} < \infty) \quad (1-30)$ 

where  $W_{K,\ell}$  is the random variable for the waiting time required for the Kth pulse to arrive at the detection center, i.e., the detection time.

Hildreth(1979) did not give the explicit form of eq.(1-30),

- 27 -

but the distribution function of  ${\tt W}_{K,\, \ell}$  ,  ${\tt f}_{K,\, \ell}({\tt t}),$  is given as

$$\mathbf{f}_{\mathbf{K},\boldsymbol{\ell}}(t) = \frac{1}{(\mathbf{K}-1)!} \cdot \mathbf{N}_{\boldsymbol{\ell}} \cdot \mathbf{r}_{\boldsymbol{\ell}} \cdot (\mathbf{N}_{\boldsymbol{\ell}} \cdot \mathbf{r}_{\boldsymbol{\ell}} \cdot t)^{\mathbf{K}-1} \cdot \mathbf{e}^{-\mathbf{N}_{\boldsymbol{\ell}} \cdot \mathbf{r}_{\boldsymbol{\ell}} \cdot t} \quad (t > 0)$$

#### H. Spark Discharge Model.

Ida(1980) proposed a spark discharge model, which is modeled after the phenomena of the occurrence of spark discharge when voltage is applied between electrodes. This model assumes that the decay of neural information from the onset of a stimulus obeys the exponential distribution,

$$f(t) = \lambda \cdot e^{-\lambda \cdot t}$$
(1-31)

where  $\lambda$  is a linear function of the stimulus intensity which is further assumed to be a linear function of time, i.e.,  $\lambda = C \cdot t$ . Hence, eq.(1-31) can be rewritten as follows;

 $f(t) = c \cdot t \cdot e^{-c \cdot t^{2}}$ Let  $F(t) = \int_{0}^{t} f(t) \cdot dt$ , then he derived the following equation;  $F(t) = 1 - e^{-\frac{C}{2} \cdot t^{2}}$  (1-32)

That is, the distribution of the latencies obeys a Weibull distribution,eq.(1-32).

\* \* \* \* \* \* \*

There are many models for the simple reaction time, too.

The role of expectancy in the simple reaction time has been emphasized by Näätänen and his collaborators(Näätänen(1970,1971), Näätänen and Merisalo(1977), Niemi and Näätänen(1981)). Only one of the models reviewed here gives a central role to the expectancy processes, the anticipation model(Thomas(1967)). But, this model ignores the sequential effects. The reaction time is affected by the foreperiod in the preceding trial(cf., the results of experiment III in this article, or the review by Niemi and Näätänen(1981)). In this dissertation, the author will propose a new model with the following characteristics;

1). The role of anticipation is emphasized.

2). The sequential effects are incorporated.

3). The model is described in terms of discrete states, i.e., the prepared and not-prepared states.

As to the third point, the author was encouraged by the following conclusion by Lupker and Theios(1977);

" The two-state model should serve as a useful tool in answering some of the basic questions regarding the temporal properties of human choice behavior."

Although their conclusion was concerned with choice reaction times, the author is interested in the question whether a two-state model is useful in the domain of simple reaction time, or not.

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CHAPTER II

### EXPERIMENTS

In the previous chapter, we saw that we need a new model, which incorporates the process of expectation (or preparedness) and predicts sequential effects. In order to construct a model, we must collect the data relevant to the model. For our purpose, at least two types of data are necessary. One type of data is concerned to the existancy of the process of expectation and the other to the sequential effects. Inspecting available evidences reported in published papers, we find some difficulties.

1) Näätänen(1970,1971) made the experiments, where the probability of the presentation of the stimulus at each moment was constant. He expected that under these conditions, the expectancy by the subject would disappear and the FP-RT relation could not be observed. However, we should not confuse objective probabilities with subjective ones, that is, under the conditions where the mathematical probability of the presentation of the stimulus is constant, the subject may expect the stimulus in some moment.

Another approach to effects of the expectancy by the subject

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on RT is the attempt by Baumeister and Joubert(1969). They varied the relative frequency of the various FPs to manipulate the expectancy. But, the FPs used by them were 2,4,8,16 sec. These FPs are highly discriminable so that we suspect that the subject might be unduly forced to develop the expectancy during the experiment.

2) In some experiments reviewed by Niemi and Näätänen(1981), FPs were very short, i.e., shorter than 1 sec, and in others, they were very long, i.e., longer than 10 sec. For too short FPs, the subject may not be able to prepare his motor system before the presentation of the stimulus when no warning signal is used. When too long FPs are used, we suspect that multiple preparation may be invoked, i.e., the process of simple reaction for longer

FPs may not be the same as that for other FPs.

3) Analyzing the data from trained and unexperienced subjects separately, Näätänen and Merisalo(1977) found differences between the two kinds of subjects in the sensitivity of the RT to manipulations of experimental conditions. In general, as to the kind of the subjects, experimenters used trained subjects or untrained ones, or did not specify the kind of the subjects.

Considering the three difficulties above, the author felt the need to carry out the series of experiments, which satisfy the following conditions;

1) Discriminability between the FPs is not so high.

2) Lengths of the FPs are not too long and not too short.

3) Kind of the subjects is controlled. In the experiemnts which will be reported here, all subjects are untrained at least with respect to reaction time experiments.

4) Ranges of the FPs used in the experiments are as equal to each other as possible.

In this dissertation, four of the experiments which were made will be reported. Experiments I and II are concerned to the phenomena which can be interpreted as effects of change in expectation. Experiments III and IV are concerned to the sequential effects.

### EXPERIMENT I

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Two ranges of FPs were used. If expectancy plays a role in a simple reaction task, we can observe shift of the optimum FP, for which the RT is the shortest, when the range of FPs is shifted. Very short FPs entails the problem of refractoriness of responses. Very long FPs entails the problem of boredom. The following two ranges were used, from 1.00 to 3.69 sec, and from 2.84 to 7.01 sec. <u>Apparatus</u>

The subject was seated in front of a desk, on which a box, 6cm x 20cm x 30cm, was laid. On the upper surface, 20cm x 30cm, of the box, nine microswitches and one red 7-segment LED(Light-Emitting Diode) were laid(Figure 1). One microswitch was at the center of the box and the other eight microswitches were arranged horizontally to fit the arrangement of the eight fingers and they were about 3cm above the switch in the center. The LED was about 5cm above the microswitch in the center. This 7segment LED displayed the number 0 as the imperative stimulus

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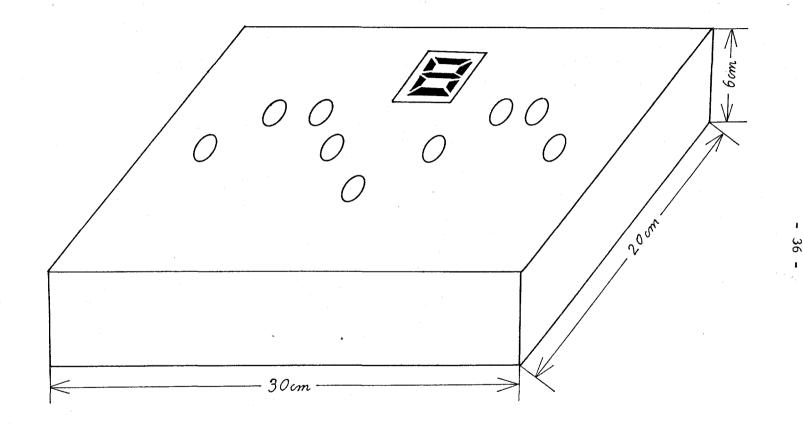


Figure 1. Arrangement of the microswitches and the LED

on the box used in experiments I and II.

and only the microswitch at the center was used as the response switch. AIDACS-3000 microcomputer system(Ai Electronics Corp.) controlled presentation of the stimulus and recorded RTs.

### Subjects

Six male students participated in experiment I. They were all untrained with respect to this type of experiment and unpaid. <u>Procedure</u>

The experiment consisted of 16 blocks, each of which had 51 trials. Each block started by experimenter's key pressing of a CRT display. A trial started with an imperative stimulus which went out when the subject pushed down the microswitch. He was instructed to press the microswitch as fast as possible after the LED lit up. The next trial began after a prescribed time(foreperiod(FP)) elapsed from the subject's response. If the subject responded before the LED lit up, that trial was discarded and the next FP was timed from the preceding false-alarm response. After one block of 51 trials finished, the subject was given as much rest time as he desired to refresh himself. Total times of experiment I were between 40 and 80 minutes.

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Two sets of FPs, set S and set L, were prepared. Each set was used in one of two experimental conditions, namely, Short FPs and Long FPs conditions. In the Short FPs condition, the FPs were 1.00, 1.30, 1.69, 2.19, 2.84 and 3.69 sec ( set S ). In the Long FPs condition, the FPs were 2.84, 3.40, 4.07, 4.88, 5.85 and 7.01 sec ( set L ). Three subjects (subjects 1,2 and 3) were tested under the Short FPs condition, and the other three (subjects 4,5 and 6) in the Long FPs condition. In a block, 50 FPs were used. The first two FPs were 2.00 sec in the Short FPs condition, and 5.00 sec in the Long FPs condition. The other 48 FPs were randomized sequence of eight set Ss in the Short FPs condition and of eight set Ls in the Long FPs condition.

The programs which were used in experiment I are given in appendix A:

#### RESULTS

The data from blocks 2 to 16 were used. Trials in which the subject responded before the LED lit up were discarded. Too slow

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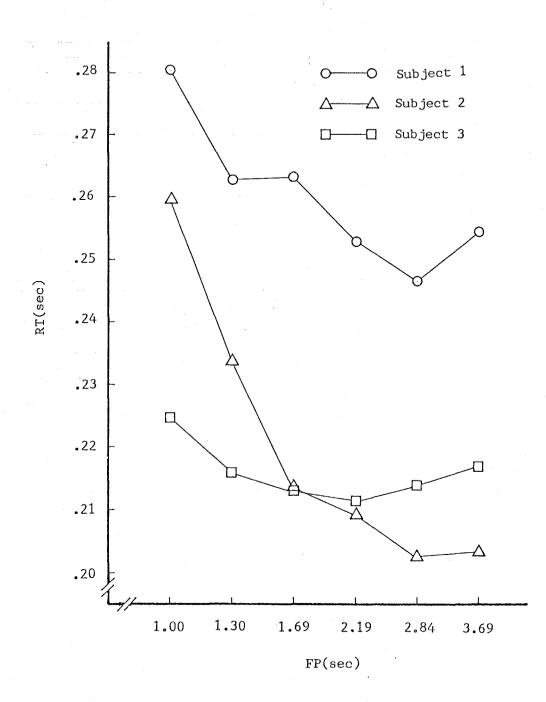
RTs were also discarded, because these were produced by the subject's distraction and so on. Proportions of these discarded trials were between 0 and 1 % when calculated individually.

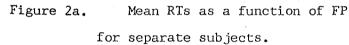
Figures 2a and 2b depicts the mean RTs graphically for separate subjects. ANOVA(Analysis of Variance) shows that differences in RTs between FPs are significant at 5 % level, except for subject 6. The differences for subject 6 can be observed at 10 % level.

In summary, we can conclude that optimum FP in the Short FPs condition is between 2.19 and 2.84 sec, and, in the Long FPs condition, between 4.88 and 5.85 sec. That is, optimum FP depends on the range from which the FPs are sampled.

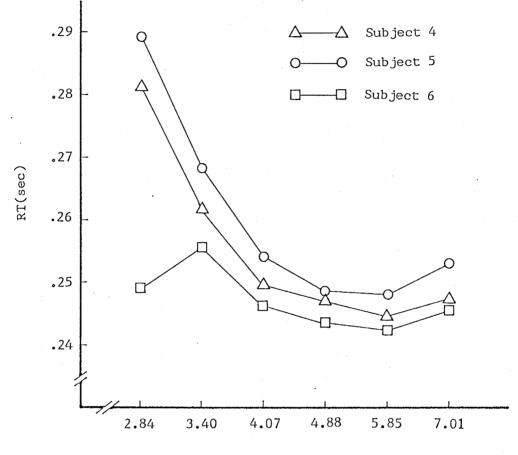
### EXPERIMENT II

In experiment II, the range of FPs is fixed, but the relative frequencies of FPs are varied. If the subject anticipates the time point at which the stimulus appears, he may be induced to expect the FP which is subjectively most often used. Two sets

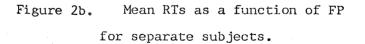




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FP(sec)



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of frequencies are used. In set Sw of FPs, shorter FPs are more often used than longer ones. In set Lw, longer FPs are more often used than shorter ones. It is predicted that the optimum FP is shorter for set Sw than for set Lw.

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### Apparatus

The apparatus used in experiment II was the same as in experiment I.

### <u>Subjects</u>

Six male subjects participated in experiment II. They were all untrained with respect to this type of experiment and unpaid. No one subject participated in both experiment I and II.

### Procedure

The procedure was the same as in experiment I except for the following points;

Experiment II consisted of 24 blocks, each block with 103 trials. Twenty-four blocks were divided into two sessions of 12 blocks each. Two sets of FPs were prepared, set Sw and set Lw. In group Sw, there were three 1.00, one 1.30, three 1.69, one 2.19, one 2.84 and one 3.69 sec FPs. In set Lw, one 1.00, one 1.30, one 1.69, three 2.19, one 2.84 and three 3.69 sec FPs. That is, in set Sw, shorter FPs were weighted and, in set Lw, longer FPs weighted, In a block, 102 FPs were used. The first two FPs were 2.00 sec. The other 100 FPs were consisted of a randomized sequence of ten set Sw's or ten set Lw's. In order to investigate contextual effects on RT under a within-subject design, the following two conditions were prepared. In the S-L condition, FPs used in the first session belonged to set Sw, and FPs in the second session to set Lw. In the L-S condition, FPs used in session 1 belonged to set Lw and FPs in session 2 to set Sw. Three subjects (subject 7,8 and 9) were tested under the S-L condition, and the other three (subjects 10,11 and 12) under the L-S condition. Total times of experiment II were between 120 and 140 minutes.

The programs which were used in experiment II are given in appendix B.

### RESULTS

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The data from blocks 2 to 12 of sessions 1 and 2 were used. Trials in which the subject responded before the LED lit up were discarded. Too slow RTs were also discarded because these RTs were caused by the subject's distraction and so on. Proportions of these discarded trials from blocks 2 to 12 of sessions 1 or 2 were below 2 % when calculated individually.

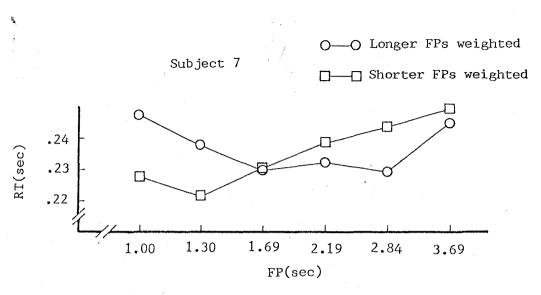
For each subject, ANOVA was applied to FP(1.30 vs. 2.84 sec) x context from which the FPs were picked out(shorter vs. longer FPs weighted, i.e., session 1 vs. 2). Table I summarizes the results. The interaction effect was significant at 5 % level for subjects 7,8 and 10. Figures 3a,3b and 3d show mean RTs of subjects 7,8 and 10 for various FPs. As to subject 11, the median test showed that medians of RTs for 1.00, 1.30 and 1.69 sec FPs were significantly different at 5 % level when longer FPs were weighted, and not significantly different when shorter ones were weighted. From this difference we can conclude that, for subject 11, the optimum FP, when longer FPs were being weighted, was shifted toward a longer FP than when shorter ones were weighted. As to subjects 9 and 12, no statistically

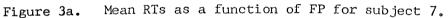
Ta	Ъ	le	Ι

Significant effects in ANOVA of experiment II	Significant	effects	in ANC	VA of	experiment	II
---	-------------	---------	--------	-------	------------	----

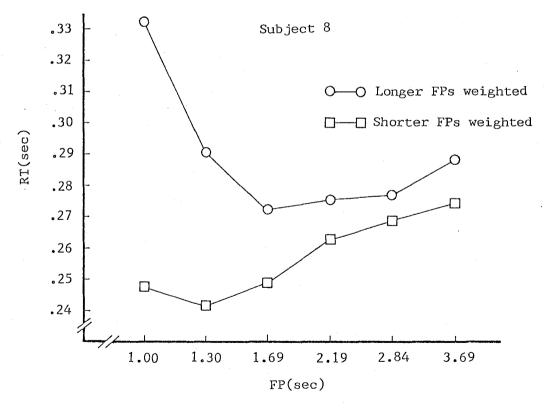
	Subject 7	subject8	subject 9	subject 10	subject 11	subject 12
main effect of context	non.	sig.	sig.	sig.	sig.	sig.
main effect of FP	non.	non.	non.	non.	non.	sig.
Interaction effect	sig.	sig.	non.	sig.	non.	non.

Note: sig.: significant at 5% level; non.: nonsignificant at 5% level.



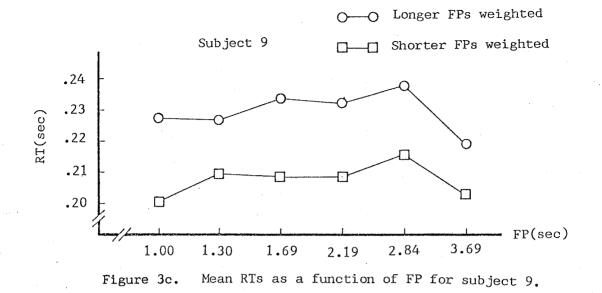


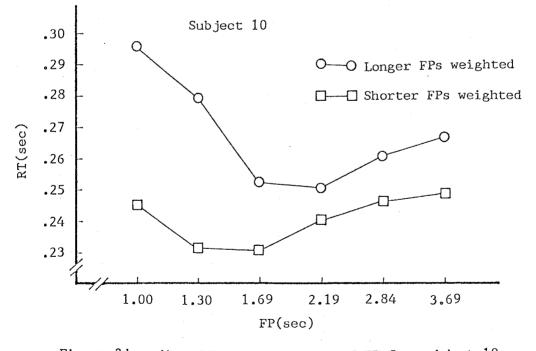
1

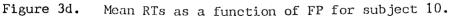




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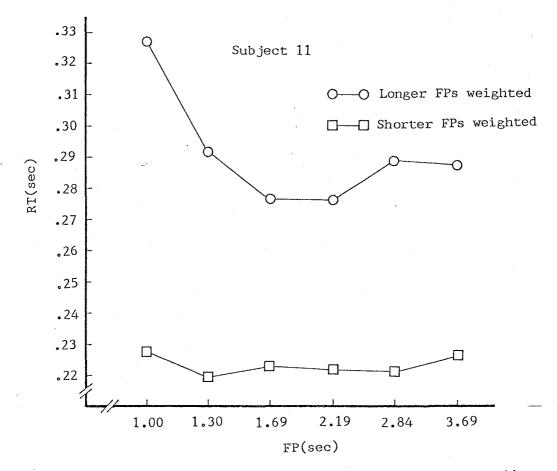
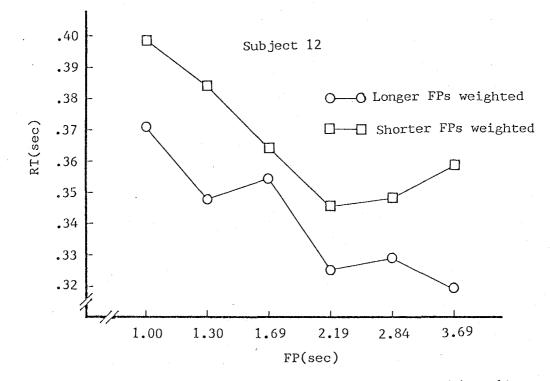
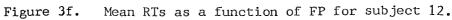


Figure 3e. Mean RTs as a function of FP for subject 11.





significant results which might show an effect of change in weight on optimum FP could be found. But as to subject 12, the pattern of the graph shows the optimum FP is shorter for the shorter FPs weighted condition than for the longer FPs weighted condition, although no significant statistical evidence could be found.

Considering the general pattern of the results obtained from experiment II, we can conclude that change in weight on FPs can bring about shift of optimum FP.

### EXPERIMENT III

When the subject anticipates the time point at which the next stimulus will be presented, his anticipation may be affected by the preceding context of the experimental situation. Reaction times for a particular FP may depend on the FP at the preceding trial.

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In experiment III, this dependency of RT on the FP at the preceding trial were investigated.

#### Apparatus

The subject was seated in front of a desk, on which a box, 5cm x 14cm x 24cm, was laid. On the upper surface, 14cm x 24cm, of the box, two microswitches and one 7-segment LED(green) were laid(Figure 4). These microswitches were arranged horizontally, separated 12cm apart, 4cm above the nearest edge of the box to the subject. The LED was mounted between and 6cm above the microswitches. When the LED, which was the imperative stimulus to respond to, 1it up, it always displayed number 0. An AIDACS-3000 microcomputer system(Ai Electrics Corp.) controlled these apparatus and recorded responses of the subject.

### Sub jects

Three students from the undergraduate course of the faculty of letters of Kyoto University participated. They were all untrained with respect to this type of experiment.

### Procedure

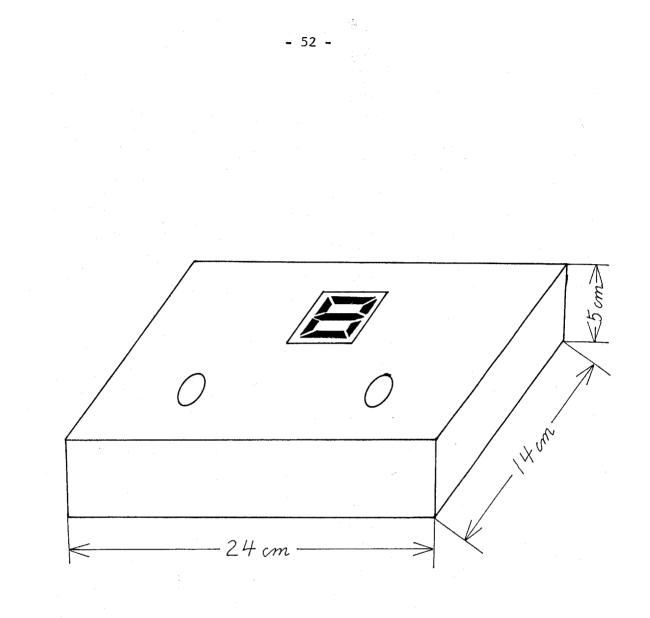


Figure 4. Arrangement of the microswitches and the LED on the box used in experiments III and IV.

The experiment consisted of 7 blocks, each of which had 103 trials. Each block started when the subject pressed down the left microswitch. When 0.5 sec had passed after this response, the LED lit up. The subject was instructed to press down the right microswitch as fast as possible when the LED lit up. The LED went out immediately when the subject responded. After some time (FP) had passed, the next trial began, that is, the LED lit up and the subject responded. An FP-LED-response cycle was repeated until the end of the block.

In a block, 102 FPs were used. The first two FPs were 2 sec. The other 100 FPs were in a randomized sequence of 20 sets of FPs. Each set consisted of 1.00, 1.30, 1.69, 2.19 and 2.84 sec FPs. It was randomized with the following restriction; 1.00, 1.69 and 2.84 sec FPs were preceded by each of the members of the set, which included itself, at least two times, respectively.

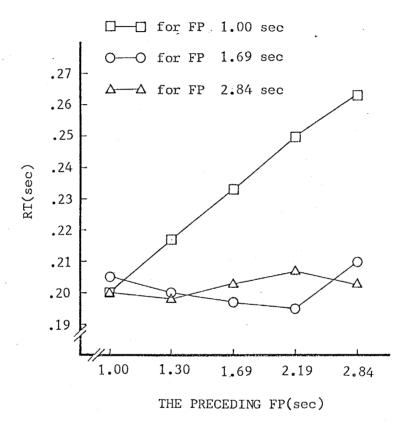
The subject was allowed to rest between blocks as long as he would like to.

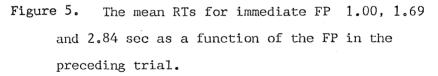
The program for experiment III is given in appendix C.

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#### RESULTS

Total times of experiment III were between 27 and 54 minutes. The data from blocks 2 through 7 were used, although the first 3 RTs and RTs for immediate FPs of 1.30 and 2.19 sec were discarded. Blocks 2 and 3 (blocks 4 and 5, blocks 6 and 7, respectively) were pooled as session 1 (session 2, session 3, respectively). The medians of RTs to 1.00, 1.69 and 2.84 sec FPs, which were classified according to the FPs in the preceding trials, were calculated. To calculate mean RTs for each combination of the immediate FPs and the preceding FPs of individual subjects, these medians were averaged over the three These mean RTs were analyzed by ANOVA with the design, sessions. immediate FP(1.00, 1.69 and 2.84 sec) x preceding FP(1.00, 1.30, 1.69, 2.19 and 2.84 sec). Main effect of immediate FP and the interaction effect of immediate FP x preceding FP were significant at 5 % level. This results indicates that mean RT is dependent on immediate FP and the preceding FP (Figure 5).





### EXPERIMENT IV

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In experiment I, II and III, the subject's response terminated the trial and started the next trial. That is, foreperiod(FP) was timed from the subject's response to the stimulus.

But, FP can be timed from another event, e.g., a warning signal. In this case, the sequence of the events in a trial is as follows; the warning signal - FP - the stimulus - the response. That is, there is a time lag between the response and the start of the next FP. This time lag may have some effect on the sequential effects found in experiment III.

In experiment IV, to investigate this possibility, an interval was inserted between the response and the start of the next FP.

### Apparatus

The apparatus used in experiment IV was the same as in experiment III, except that, in experiment IV, an electric buzzer was used as a feedback signal.

### <u>Subjects</u>

Eight subjects from the undergraduate course of the faculty of letters of Kyoto University participated in experiment IV. They were all untrained with respect to this type of experiment. <u>Procedure</u>

The procedure was the same as in experiment III, except for the following points;

Experiment IV consisted of 10 blocks, which were divided into 2 groups, sessions 1 and 2. In one of the two sessions, the experimental condition was the same as in experiment III (the continuous condition). In the other session (the discrete condition), each trial began after the buzzer sounded for 0.2 sec. In the first trial, the buzzer sounded when the experimenter pushed down the start key on the CRT display. After trial 2, the buzzer sounded after 0.5 sec had passed on from the subject's response, pressing down the right switch, to the LED in the preceding trial. After the buzzer sounded, the subject was allowed to press the left switch. FPs were timed after this left switch pressing. If he pressed down the left switch before 0.5 sec had passed after the preceding response or during the sounding of the buzzer, the buzzer continued to sound for 5 sec after the release of the left switch. By this prolonged sounding, the subject was informed that he pressed down the left switch too early.

Four subjects served in the continuous (or discrete) condition in session 1 (or 2, respectively), and the other four the discrete (or continuous) condition in session 1 (or 2, respectively).

The programs which were used in experiment IV are given in appendix D.

### RESULTS

Total times of experiment IV were between 48 and 71 minutes. The data from blocks 2 to 5 and from blocks 7 to 10 were used, although the first 3 (or 2) RTs of each block in the continuous (or discrete, respectively) condition and RTs for the immediate FPs of 1.30 and 2.19 sec were discarded.

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Table II. The mean RT(sec) for immediate FPs of 1.00,

1.69 and 2.84sec as a function of the FP in the preceding trial.

			F	'P in the p	receding t	cial(sec)	
			1.00	1.30	1.69	2.19	2.84
immediate		1.00	.205	.217	.221	.232	.243
the imm		1.69	.198	.199	.205	.207	.216
FP in the trial(sec)	trial(s	2.84	.201	.199	.201	.202	.203

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Medians of RTs for each combination of 3 immediate FPs, 1.00, 1.69 and 2.84 sec, and the preceding FPs, 1.00, 1.30, 1.69, 2.19 and 2.84 sec, were calculated for sessions 1 and 2. These medians were analyzed by ANOVA with the design, FP (1.00, 1.69 and 2.84 sec) x the preceding FP (1.00, 1.30, 1.69, 2.19 and 2.84 sec) x conditions of sessions (continuous vs. discrete) x order of conditions (from the continuous(in session 1) to the discrete condition(in session 2) vs. from the discrete(in session 1) to the continuous condition(in session 2)).

Main effects of immediate FPs and of the preceding FPs, and interaction effect of immediate FP x the preceding FP were significant at 5 % level. The use of the warning signal had no statistically significant effects. Medians of RTs, which were averaged over non significant factors, were summarized in Table II.

#### DISCUSSION

The results of experiments I and II suggest that expectation

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plays some role in simple reaction task and the results of experiments III and IV indicate that this expectation in part depends on the FP in the preceding trial. These conclusions are compatible with the review by Niemi and Näätänen(1981).

Of course, expectation or anticipation of the occurrence of the stimulus in simple reaction task depends on the perception of time. Hence, we must review studies on the time perception, before we construct a new model, which is based on the process of anticipation. CHAPTER III

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# TIME PERCEPTION

## A. The Power Law.

Many authors adopted power functions as psychophysical functions, which relate subjective time to physical one. Ekman(1958) proposed the model, which determined the exponent by the method of fractionation. In the method of fractionation, the subject is instructed to adjust a variable stimulus so that it appears subjectively equal to a certain fraction of the standard, usually half the standard. Ekman(1958) set the power function as eq.(3-1),

$$R = C(S-S_0)^n \tag{3-1}$$

where R (or S) is a subjective (or physical) scale of time, C is a constant related to the unit of measurement of R,  $S_0$  is a kind of absolute threshold, and n is the exponent determining the curvature of the function.

When the subject adjusts the variable stimulus to a value,  $S_p$ , which, subjectively, is p times that of the subjective value of the standard, S,

$$pR = C(s_p - s_0)^n$$
 (3-2)

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Combining eqs.(3-1) and (3-2) and solving for  $S_p$ ,

$$S_{p} = S_{0}(1-k) + kS$$
 (3-3)  
where  $k = p^{1/n}$ .

Eq.(3-3) describes a relation between S, a standard stimulus, and  $S_p$ , a variable stimulus. Applying eq.(3-3) to the data, we can get the value of k, the slope of eq.(3-3), and  $S_0(1-k)$ , the intercept when S=0.

From the values of k and  $S_0(1-k)$ , we can get

$$n = \frac{\log p}{\log k}$$

and

$$S_0 = \frac{S_0(1-k)}{1-k}$$

With these values of n and  $S_0^{}$ , we can specify eq.(3-1) except the unit parameter, C.

The model proposed by Björkman and Holmkvist(1960)

incorporated the effect of time-order. Their model is based on the power law,  $R = C(S-S_0)^n$ , and the empirical relation (eqs.(3-4) and (3-5)) between the standard stimulus, S, and the variable stimulus,  $S_L$  and  $S_{1/2}$ , where  $S_L$  and  $S_{1/2}$  are the adjusted

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stimulus as equal to or as half of the standard stimulus S.

$$S_{T} = bS + a \tag{3-4}$$

$$s_{1/2} = b_1 S + a_1$$
 (3-5)

Let  $P_r(t)$  be the proportion retained after t time passed from the end of S. For a suitable pair of standard stimuli,  $S_1$ 

and  $S_2$ ,  $S_L = S_{1/2}$ . For this pair of  $S_L$  and  $S_{1/2}$  (=t),  $\frac{(S_L - S_0)^n}{(S_1 - S_0)^n}$   $= P_r(t)$   $= \frac{2(S_{1/2} - S_0)^n}{(S_2 - S_0)^n}$ 

where  $S_0$  and  $S_0'$  are the absolute thresholds for the standard and variable stimuli.

Substituting for  $S_1$  and  $S_2$  the values obtained from eqs.

(3-4) and (3-5),  

$$\frac{b^{n}(S_{L}-S_{0})^{n}}{(S_{L}-a-bS_{0})^{n}}$$

$$= P_{r}(t)$$

$$= \frac{2b_{1}^{n}(S_{1/2}-S_{0})^{n}}{(S_{1/2}-a_{1}-b_{1}S_{0})^{n}}$$
Substituting t for  $S_{L}$  and  $S_{1/2}$ ,  
 $r = \frac{2b_{1}^{n}(S_{1/2}-S_{0})^{n}}{(S_{1/2}-a_{1}-b_{1}S_{0})^{n}}$ 

$$b^{n} \left[ \frac{t - S_{o}}{t - a - bS_{o}} \right]^{n} = 2 b_{i}^{n} \left[ \frac{t - S_{o}}{t - a_{i} - b_{i}S_{o}} \right]^{n}$$

hence

$$\frac{b}{t - (a + b_{s_0})} = \frac{2^{\frac{1}{b_1}}}{t - (a_1 + b_1 s_0)}$$

This should hold for all positive values of t.

Thus,

$$\mathcal{N} = \frac{\log \frac{1}{2}}{\log \left(\frac{b_i}{b}\right)}$$

and

$$S_0 = \frac{a_i - a}{b - b_i}$$

Eisler(1975) derived the power law from the empirical linearity described as eqs.(3-4) or (3-5), which is formulated again as eq.(3-6),

$$\oint_{\mathcal{P}} = \alpha \oint + b \tag{3-6}$$

where  $\oint$  denotes the physical value of the standard duration, and  $\oint_V$  the variable duration (these notational changes are in accord to Eisler's notation.).

Let f and g be the psychophysical functions which relate subjective values,  $\chi$  and  $\chi_V$ , to physical values, # and  $\#_V$ , as follows,

$$\begin{aligned} 
\psi &= f(\Phi) \\ 
\mathcal{K} &= g(\Phi) \end{aligned} \tag{3-7}$$
(3-8)

If the subject carried out an r setting, we have

$$\mathcal{V}_{\mathcal{T}} = \mathcal{F} \mathcal{V} \tag{3-9}$$

Eqs.(3-6) to (3-9) yield

$$f(\underline{\Phi}) = g(\alpha \underline{\Phi} + b) \tag{3-10}$$

Taking the derivative of eq.(3-10) with respect to r yields

$$f(\underline{\Phi}) = (\alpha'\underline{\Phi} + b') \cdot \beta'(\alpha \underline{\Phi} + b)$$
(3-11)

and with respect to  $\oint$  yields

$$f(\underline{P}) = a g'(a \underline{P} + b) \tag{3-12}$$

Dividing eq.(3-12) by eq.(3-11) yields

$$\frac{rf(\overline{\Phi})}{f(\overline{\Phi})} = \frac{\alpha}{\alpha'\overline{\Phi} + b'}$$
(3-13)

and integrating eq.(3-13) with respect to  $\oint$  yields

$$\Gamma \log f(\underline{P}) = \frac{\alpha}{\alpha} \log |\alpha' \underline{P} + b'| + C_{i}(\Gamma)$$

or

$$f(\underline{\Phi}) = C(r) \cdot (\alpha' \underline{\Phi} + b')^{\alpha' r}$$

Because  $f_{(1)}$  is independent of r,  $f_{(2)}$  is rewritten in the following way,

$$\Psi = f(\underline{\Phi}) = \propto (\underline{\Phi} - \underline{\Phi}_0)^{\prime 3}, \qquad \underline{\Phi} > \underline{\Phi}_0$$

Eisler(1976) reviewed 111 studies from 1868 to 1975 and concluded that a value of .9 seemed to come closest to the

exponent of subjective duration. From table 1 in the review by Eisler(1976), we can see the exponents ranging from .31 to 1.36.

Blankenship and Anderson(1976) tested their simple weighted sum model, eq.(3-14), for time perception.

$$R_{ij} = A(w_1d_i + w_2d_j) + B$$
(3-14)

They had the subject to rate the total duration,  $R_{ij}$ , of two time intervals,  $d_i$  and  $d_j$ , which were presented successively.

Analyzing their data by ANOVA, they concluded that eq.(3-14) was confirmed

Cuttis and Rule(1977) proposed a more general model, eq.(3-15), than eq.(3-14),

$$J_{ij} = a[w \phi_i^k + (1 - w) \phi_j^k]^m + b$$
(3-15)

where  $J_{ij}$  denotes the judgement by the subject,  $\phi_i$  and  $\phi_j$  denote the two stimuli, w denotes the weight, and a and b are coefficients of the linear equation.

Curtis and Rule(1977) got the values of parameters in eq. (3-15) as follows,

$$J_{ij} = .95 (.5/ \phi_i^{..94} + .49 \phi_j^{..94})^{.49} + .94$$
(3-16)

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for judgment of total magnitude of simultaneously presented temporal intervals,

and

$$J_{ij} = .53(.46 \phi_i^{.09} + .54 \phi_j^{.09})^{.08} + 1.25$$
(3-17)

for judgments of average duration of successively presented stimuli.

With the assumption that subjective duration is related to measured duration by a linear function, both equations can be rewritten as follows,

For eq.(3-17),

$$Y_{ij} = Y_i + Y_j \tag{3-18}$$

For eq.(3-16),

$$Y_{ij} = (Y_i^2 + Y_j^2)^{\frac{1}{2}}$$
(3-19)

That is, they concluded that (1) when the information to be integrated was presented sequentially, the judgment was made in the way which was consistant with a linear composition rule, eq.(3-18), and (2) when the information was presented simultaneously, judgments were based on the vector summation rule, eq.(3-19).

### B. Logarithmic Psychophysical Law.

In his model of the "internal clock", Treisman(1963) adopted a logarithmic function to represent the magnitude of the time interval stored in the short term memory.

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Treisman(1964) criticized the psychophysical power law. He argued; "... a model sufficient to account for the result of any direct scaling experiment can be based on either a power function or a log function law. This is true of each scaling procedure, not just of fractionation, when the model is adapted appropriately.".

### For example;

Let the weight  $W_{c}$  was chosen as being subjectively half as great as the given weight  $W_{s}$ . If the power law was adopted,

 $2 W_{c}^{n} = W_{s}^{n}$ 

hence,

$$n \log W_{\rm S} - n \log W_{\rm C} = \log 2$$

That is, if we write,

$$s = n \log W + C$$

then

$$S_s - S_c = log 2$$

(3-20)

Eq.(3-20) means, according to Treisman(1964), that the log function can also describe the data from the ratio (1/2) setting experiment, as well as the power function does.

### C. Weber's Law Models.

Getty(1975) compared Weber's law models with counter models. He generalized Weber's law as follows,

$$Var(T) = k_W^2 \cdot T^2 + V_R$$
 (3-21)

where Var(T) is the total variance,  $V_R$  is sum of the all magnitudeindependent variances and  $k_W^2 \cdot T^2$  is sum of the all magnitudedependent variances.

Square-root of  $k_W^2 \cdot T^2$  is  $\sqrt{k_W^2 \cdot T^2} = k_W \cdot T$ , so  $k_W$  is the Weber fraction.

According to the counter model, which was proposed by Creelman (1962), the total variance can be divided as follows,

$$Var(T) = k \cdot T + V_{p}$$
 (3-22)

That is, the sum of the all magnitude-dependent variances is proportional to stimulus magnitude (time interval) T.

In general, Poisson counter models produce the variance and the mean, both of which are proportional to the time interval T, in which the counting was made.

Distribution of number of counts in an interval T approaches to normal distributions with a mean  $\lambda$ .T and a variance  $\lambda$ .T, as T becomes larger. So, Kinchla(1972), in his data analysis, used a Gaussian random variables.

Getty(1975) tested eq.(3-21) and eq.(3-22) against his data from his forced-choice experiment and concluded that Weber's law model is better.

Getty(1976) also compared Weber's law models with proportional variance models, using the silent counting task, and reached to the same conclusion as in Getty(1975).

### D. Constant Variance Models.

In the model proposed by Allan, Kristofferson and Wiens (1971), variances associated with time perception are constant irrespectively of length of time intervals. They conceptualized the mechanism of time perception as follows;

Suppose that at some time after the onset of a d<sub>i</sub>-msec stimulus, an interval timing process is activated by the stimulus onset. This delay is called the psychological onset time.

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Similarly, the offset of the stimulus terminates the internal timing process after a time delay called the psychological offset time. The psychological onset and offset times were assumed to have uniform distributions,  $f_1(u)$  and  $f_2(u)$ , respectively.

$$f_{1}(u) = \begin{cases} 1/q & \text{if } 0 < u < q \\ 0 & \text{otherwise} \end{cases}$$

and

$$f_{2}(u) = \begin{cases} 1/q & \text{if } d_{i} < u < d_{i} + q \\ 0 & \text{otherwise} \end{cases}$$

where q is constant irrespective of  $d_i$ .

Then, the distribution of durations of the internal timing process, denoted as g(u'), is

$$g(u') = \int f_2(u) \cdot f_1(u - u') \cdot du$$

$$= \begin{cases} \frac{q + d_i - u'}{q^2} & \text{if } d_i < u' < d_i + q \\ \frac{q - d_i + u'}{q^2} & \text{if } d_i - q < u' < d_i \\ 0 & \text{otherwise} \end{cases}$$

That is, the graph of g(u') is an isosceles triangle with a base of 2q msec.

The real-time criterion model by Kristofferson(1977) also

made the distribution of the time at which a criterion occurs an isosceles triangle.

### E. Nontemporal Factors.

Hornstein and Rotter(1969) found effects of sex and methods on temporal perception. They employed three methods, the method of verbal estimation (MVE) in which a subject makes a verbal judgment of the length of a physical interval, the method of production (MP) in which a subject must translate a verbalized interval into a physical one, and the method of reproduction (MR) in which a subject must reproduce physically an interval of a given duration first presented physically by an experimenter. Their data showed that (1) as to male subjects, in MR, they reproduced shorter intervals than presented, but, in MVE and MP, their responses were accurate, and (2) as to female subjects, in MVE, their verbal estimations were larger than physical ones, but, in MP and MR, they produced or reproduced shorter intervals.

Cahoon and Edmonds(1980) investigated an effect of expectancy on time estimation. They instructed the experimental subjects as follows: "There will be a delay in starting the experiment.

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I will return for you when we are ready. Would you mind calling me in the other room when the water starts boiling? Thanks.". In the instruction to the control subjects, reference to the water was omitted. After giving the instruction, the experimenter left the room for 240 sec. At the end of that interval, the experimenter returned and asked the subject to estimate the elapsed time. The experimental group tended to overestimate the time relative to the control group.

Thomas and Weaver(1975, also cf. Thomas and Cantor(1975)) proposed the following model:

A visual stimulus is analized by a timer called f processor and by visual information processors called g processors. The output, f(t,I), of the f processor is a temporal encoding which is directly related to t and the amount of attention allocated to the timer. The output, g(I,t), of the g processors contains encodings of the nontemporal stimulus features and an encoding, g\*(I,t), of the time spent processing I. It is assumed that perceived duration,  $\mathcal{T}$ , is a weighted average,

 $\mathcal{T} = a \cdot f(t, I) + (1 - a) \cdot g^*(I, t)$ 

Massaro and Idson(1978) investigated perception of duration of the tones which were followed by masking tones. They proposed the following model,

$$JD = PD + K \cdot t_m \tag{3-23}$$

and

$$PD = X + Y \tag{3-24}$$

where

$$\mathbf{x} = \alpha \cdot \left[ 1 - e^{-(\theta_p \cdot t_p)} \right]$$

and

$$\mathbf{Y} = (\mathbf{X} - \mathbf{X}) \cdot \left[ 1 - e^{-(\theta_{\mathbf{I}} \cdot t_{\mathbf{I}})} \right]$$

PD is the perceived duration of the target tone and JD is the judged duration of the target. Eq.(3-23) means that JD is PD plus a constant proportion, K, of mask duration,  $t_m$ . Eq.(3-24) means PD consists of two components, X and Y. X is the perceived duration obtained during the actual duration of the target. The value of  $\chi$  is the asymptotic value of perceived duration,  $\mathscr{O}_p$ represents the rate of growth of PD during the time of target presentation,  $t_p$ . Y is the component which is added during the silent interval,  $t_T$ , following target offset.  $\mathscr{O}_I$  represents

the growing rate during this silent interval.

Pöppel(1978) proposed a taxonomy of time experiences into five elementary ones (experience of duration, simultaneity/ successiveness, sequence, present, and anticipation). His basic assumption is that time perception has to be related to the occurrence of events as they are perceived and actions taken by the subject. Duration estimation of longer intervals is determined by the amount of information processed (and/or stored) or by the mental content. As to experiences of simultaneity/successiveness, he pointed out two aspects of temporal resolving power, that is, fusion and order thresholds. Fusion threshold is dependent on sensory modalities, but, order threshold is independent on them. Experience of sequence is concerned to the order in which events occurred. As to the experience of present, he insisted that temporal intervals up to a few seconds are experienced in a way qualitatively different from longer temporal intervals. Time interval of approximately 2 sec is experienced as a unit, that is, as a present. Anticipation is concerned to temporal organization, that is, to the programming of future behavior sequences.

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Most prevailing psychophysical functions are power functions. But, in Eisler(1976)'s review of 111 studies, the exponents range from .31 to 1.36. This wide range of exponents of the power functions which relate physical stimuli to psychological scales let the author doubt of the validity of power functions as psychophysical functions. Treisman(1964) criticized the power law from theoretical point of view, which was briefly reviewed in section B of this chapter.

Apart from the discussion which of the power law or the logarithmic law is proper one, Allan et. al(1971) proposed a constant variance model. According to their model, perception of time is essentially a linear function of physical time. But, Getty(1975) generalized Weber's law and his model succeeded in describing his data.

At present, there are two types of psychophysical functions, power or log functions, and two types of variance models,

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constant variance models and Weber's law.

Reviewed in section E, time perception is also affected by nontemporal factors. Pöppel(1978) insisted that intervals longer than 2 sec are perceived in a way qualitatively different from shorter ones.

With all these varieties of theories of time perception in mind, we cannot adopt the specific model of time perception, on which a model of simple reaction time would be based. Foreperiods in a simple reaction task may include both shorter and longer than 2 sec intervals.

## CHAPTER IV

### A TWO-STATE MODEL

In chapter I, we saw that, for choice reaction time, the two-state (prepared and unprepared states) model by Falmagne (1965) is simple with respect to its structure and successful in describing data. For simple reaction time, we found one model, which incorporates a process of expectation/anticipation. But, this model does not predict the sequential effects, the effects of the preceding FPs.

In chapter II, the author reported experiments, which confirmed importance of expectation in simple reaction task and the effects of the preceding FP. In this chapter, the author proposed a model, which has the following three characteristics; 1) The model is based on the process of expectation (cf. the results of experiments I, II, III and IV).

2) The sequential effects are incorporated (cf. the results of experiments III and IV).

3) The model is described in terms of discrete states, i.e., the prepared and not-prepared states. As to the term preparedness, there are other terms, which have close relationships to it, i.e., expectation, anticipation and refractoriness. Refractoriness

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frequently refers to the physiological state of being not able to respond immediately after some event. The term 'adaptation level' is used in reference to sensory processes. Expectation or anticipation refers to a process at higher level. The term 'preparedness' may be used in reference to mental or motor system. As to our two-state model, it is not important to determine to which kind of processes the term 'state' refers, physiological, sensory or conscious ones. These processes may occur simultaneously. What we should make clear is that there are two states in one of which the subject can be at a given time. But, if these states have some names, it would be better. According to Falmagne(1965)'s terminology, the term 'prepared' will be used.

As to the type of the new model, it should be qualitative. In order to make the model quantitative, we must adopt a specific psychophysical scale of time, because the anticipation is based on the perception of time. But, as reviewed in chapter III, there is no scale of time which is accepted by most investigators.

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#### A MODEL

When we fixed a set of FPs to use, we observe that mean RTs for the various FPs differ (cf. the results of experiment I). It seems that the subject was prepared to respond for FPs with about relatively middle length. Having this in mind, the following three assumptions were proposed.

Assumption 1.

A subject is in one of two states, the prepared state (abbreviated as Sp) and the not-prepared state (abbreviated as Snp).

Assumption 2.

When the subject is in Sp (or in Snp, resp.), the distribution function of reaction time is

Fp(x) (or Fnp(x), resp.).

Assumption 3.

At the start of a trial, the subject is in Snp. After some time has passed, the subject enters into Sp. The distribution function of the time at which the subject enters into Sp is D(x).

As to the exact form of Fp(x) or Fnp(x), the general-gamma distribution, eq.(4-1), was proposed by McGill and Gibbon(1965) and the Weibull distribution, eq.(4-2), by Ida(1980).

$$F(\mathbf{x}) = I - \sum_{i=0}^{i=k} C_i \cdot e^{-\lambda_i \cdot \chi}$$

$$F(\mathbf{x}) = I - e^{-\lambda \cdot (t-L)^m}$$

$$(4-2)$$

The general-gamma distribution is obtained when exponential distributions are summed. The gamma distribution is the special case of the general-gamma distribution in which the values of parameters of the exponential distributions are equal to each other (cf. McGill(1963)). The Weibull distribution is obtained when the conditional probability at time x that a subject who has not yet responded will come to respond, r(x), obeys the following equation;

 $r(x) = \lambda \cdot m \cdot (x - L)^{m-1}$ 

In this article, the aspects of the two-state model which do not depend on the exact forms of Fp(x) and Fnp(x) are discussed. Only the relation that the mean of Fp(x) is shorter than the one of Fnp(x) is assumed.

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Assumption 4 was introduced to account for the effect of the preceding FP.

Assumption 4.

$$T_0 = f(T_B, w_B, T_{pr}, w_{pr})$$

where Tpr is the FP in the preceding trial and  $T_B$ is determined by the background context.  $w_{pr}$  and  $w_B$  are weights for Tpr and  $T_B$ . That is,  $T_0$  depends on gloval ( $T_B$ ) and local (Tpr) contexts.  $T_0$  is defined as one of parameters of D(x), that is, D(x) should be written as D(x, $T_0$ ).

It seems evident that a subject cannot maintain his preparedness indefinitely.

Assumption 5.

After entering into Sp, the subject remains in it for a while. The distribution function of

this distribution is R(x).

Now, because the model proposed here is a qualitative approximation, let us make the functions, D(x), R(x) and  $f(T_B, w_B, T_{pr}, w_{pr})$ , simple ones.

Assumption 3-1.

$$D(x,T_0) = \begin{cases} 0 & x \leq T_0 \\ (x - T_0)/\delta_0 & T_0 \leq x \leq T_0 + \delta_0 \\ 1 & T_0 + \delta_0 < x \end{cases}$$

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where  $\delta_0 = \delta \cdot T_0$ 

At this point,  $D(x,T_0)$  should be written as  $D(x,T_0, \delta_0)$ . See Figure 6.

Assumption 4-1.

$$T_0 = f(T_B, w_B, T_{pr}, w_{pr})$$
$$= (w_B \cdot T_B + w_{pr} \cdot T_{pr}) / (w_B + w_{pr})$$

Assumption 5-1.

$$R(\mathbf{x}) = \begin{cases} 0 & \chi \leq \rho \\ (\mathbf{x} - \rho)/\lambda & \rho < \chi \leq \rho + \lambda \\ 1 & \rho + \lambda < \chi \end{cases}$$

At this point, R(x) should be written as  $R(x, \rho, \lambda)$ .

See Figure 7.

With these assumptions, we can derive a distribution function of simple RT at time t, which is measured from the start of the trial. To simplify notations, some of the

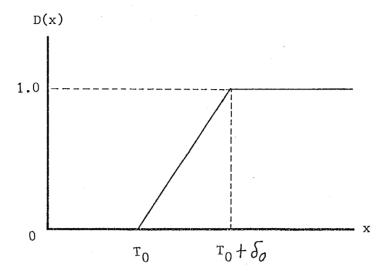


Figure 6. The distribution function, D(x), of the time at which the subject enters into  $S_p$  from  $S_{np}$ .

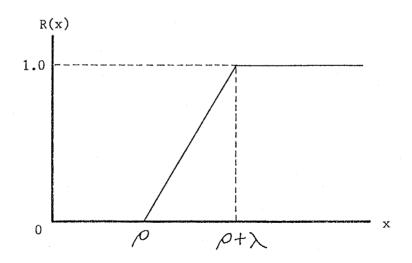


Figure 7. The distribution function, R(x), of the duration for which the subject remains in  $S_p$ .

parameters of the distribution functions are suppressed, but the reader should not be confused by this notational simplification.

Let 
$$\tilde{R}(x) = 1 - R(x)$$
. That is,  $\tilde{R}(x)$  is the probability that  
the subject remains in Sp during more than x time units. Then,  
 $\tilde{R}(t-x)\cdot dD(x)$  is the probability that the subject enters into Sp  
at time x and be still in Sp at time t. The probability that the  
subject is in Sp at time t,  $P(t,T_0)$ , can be expressed as follows,  
 $P(t,T_0) = \int_0^t \tilde{R}(t-x)\cdot dD(x)$  (4-3)

Now, let  $RT(x,t,T_0)$  be the distribution function of simple RT when the stimulus is presented after time t has elapsed from the start of the trial.

Then,

$$RT(x,t,T_0) = P(t,T_0) \cdot Fp(x) + (1 - P(t,T_0)) \cdot Fnp(x)$$

Hence, mean RT at time t,  $\overline{RT}(t,T_0)$ , is

$$\overline{\mathrm{RT}}(t, T_0) = \int_0^\infty \mathrm{dRT}(x, t, T_0)$$
  
=  $P(t, T_0) \cdot \int_0^\infty \mathrm{dFp}(x) + (1 - P(t, T_0)) \cdot \int_0^\infty \mathrm{dFnp}(x)$   
=  $P(t, T_0) \cdot \overline{\mathrm{RTp}} + (1 - P(t, T_0)) \cdot \overline{\mathrm{RTnp}}$  (4-4)

where  $\overline{\text{RT}p}$  and  $\overline{\text{RT}np}$  are the mean RTs when the subject is in Sp or in Snp, respectively.

Figure 8 shows the graph of the theoretical  $\overline{RT}(t,T_0)$  for immediate FPs of 1.00, 2.00 and 3.00 as a function of Tpr value (Tpr=1.00, 1.50, 2.00, 2.50 and 3.00) when we set  $\mathcal{P} = \lambda = 2.00, \ \delta = 1.5, \ W_B = 2.0, \ W_{pr} = 1.0, \ T_B = 0.0, \ \overline{RT_p} = 0.2 \ and \ \overline{RT_np} = 0.3.$ 

The program which was used to calculate the values in Figure 8 is given in appendix E.

Figure 9 shows the graph of the theoretical mean RTs,  $\overline{RT}(t) = averaged \overline{RT}(t,T_0)$  over  $T_0$  values.

Inspecting the qualitative trends in Figures 8 and 9, we can conclude that the model proposed here fits qualitatively to the fact that 1) there is the optimum FP (Figure 9, also compare Figure 9 with Figures 2a and 2b), and 2) mean RTs depend on the FP in the preceding trial (Figure 8, also compare Figure 8 with Figure 5.).

#### MATHEMATICAL ANALYSIS

If we want to calculate the integration of eq.(4-3), we

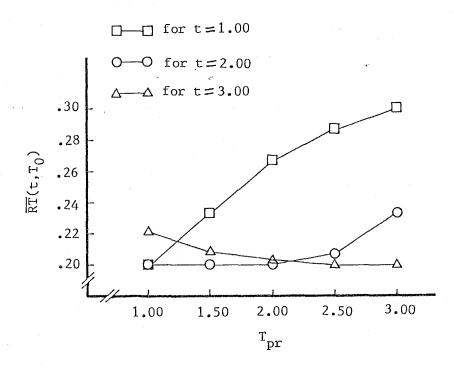


Figure 8. The theoretical mean RT for immediate FP 1.00, 2.00 and 3.00 in the psychological unit as a function of the preceding FP. The parameters were set as follows:  $\rho = 2.00$ ,  $\lambda = 2.00$ ,  $\delta = 1.5$ ,  $T_B = 0.0$ ,  $W_B = 2.00$ ,  $W_{PT} = 1.00$ ,  $\overline{RT} = 0.20$  and  $\overline{RT_{PT}} = 0.30$ .

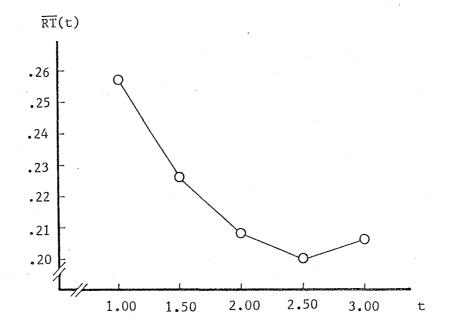


Figure 9. The theoretical mean RT as a function of immediate FP. The values of the parameters were the same as in Figure 8.

meet rather complex situation, where we must investigate many situations, each of which corresponds to each combination of the ranges of values of the parameters,  $T_0$ ,  $\delta_0$ ,  $\rho$  and  $\lambda$ , of the functions, D(x) and R(x). The forms of D(x) and R(x) are natural approximations to the real ones. Densities of D(x) and R(x) are concentrated on rather restricted ranges, which are some distant from the origin 0. The forms of D(x) and R(x) are very simple, so the programming and calculation by computer of these functions is very easy.

But, computer calculations leave some dissatisfaction. We can see only the narrow range of the behaviors of the model which were simulated. The other part of the range of the behaviors which have not yet simulated is unknown until it is calculated.

In the following part of this chapter, in order to analyze the model mathematically, we make the forms of D(x) and R(x)mathematically analyzable ones.

Assumption 3-2.

$$D(\mathbf{x}, \delta) = 1 - e^{-\delta \cdot \mathbf{X}}$$

where  $\delta$  is a decreasing function, g(T<sub>0</sub>), of T<sub>0</sub>.

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Assumption 5-2.

 $R(x) = 1 - e^{-p \cdot x}$ 

The assumption that  $\delta$  is a decreasing function of  $T_0$  is due to the fact that  $\int_0^\infty x \cdot dD(x, \delta) = \frac{1}{\delta}$ 

 $\delta$  is a monotonic function of T<sub>0</sub> and can be written as  $\delta = g(f(T_B, w_B, T_{pr}, w_{pr}))$  by assumption 4. In assumption 3-2,  $D(x, \delta)$  has  $\delta$  instead of T<sub>0</sub> as one of the explicit parameters. So, in the following analysis, we use  $\delta$  as the parameter which depends on the FP in the preceding trial.

With assumptions 3-2 and 5-2, eq.(4-1) can be calculated as follows;

$$P(t, \delta) = \int_{0}^{t} \tilde{R}(t - x) \cdot dD(x)$$

$$= \int_{0}^{t} e^{-\rho \cdot (t - x)} \delta \cdot e^{-\delta \cdot x} dx$$

$$= \delta \cdot e^{-\rho \cdot t} \int_{0}^{t} e^{(\rho - \delta) \cdot x} dx$$

$$= \delta \cdot e^{-\rho \cdot t} \left[ \frac{1}{(\rho - \delta)} \cdot e^{(\rho - \delta) \cdot x} \right]_{0}^{t}$$

$$= \delta \cdot e^{-\rho \cdot t} \left\{ \frac{1}{(\rho - \delta)} \cdot e^{(\rho - \delta) \cdot t} - \frac{1}{(\rho - \delta)} \right\} = \frac{\delta}{\rho - \delta} \left( e^{-\delta \cdot t} - e^{-\rho \cdot t} \right)$$

Hence, eq.(4-4) is given as

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$$\overline{\mathrm{RT}}(\mathrm{t}, \mathcal{S}) = \mathrm{P}(\mathrm{t}, \mathcal{S}) \cdot \overline{\mathrm{RT}} + (1 - \mathrm{P}(\mathrm{t}, \mathcal{S})) \cdot \overline{\mathrm{RT}} \mathrm{np}$$

$$= \overline{\mathrm{RT}}\mathrm{np} + (\overline{\mathrm{RT}}\mathrm{p} - \overline{\mathrm{RT}}\mathrm{np}) \cdot \frac{\delta}{\rho - \delta} \cdot (e^{-\delta \cdot t} - e^{-\rho \cdot t})$$

$$\frac{\partial \overline{\mathrm{RT}}(t, \delta)}{\partial t} = (\overline{\mathrm{RT}}\mathrm{p} - \overline{\mathrm{RT}}\mathrm{np}) \cdot \frac{\delta}{\rho - \delta} \cdot (-\delta \cdot e^{-\delta \cdot t} + \rho \cdot e^{-\rho \cdot t})$$

$$= (\overline{\mathrm{RT}}\mathrm{p} - \overline{\mathrm{RT}}\mathrm{np}) \cdot \frac{\rho \delta}{\rho - \delta} \cdot e^{-\rho \cdot t} (1 - \frac{\delta}{\rho} \cdot e^{(\rho - \delta) \cdot t})$$

Let  $\frac{\partial \overline{RT}(t, \delta)}{\partial t} = 0$ 

Then

$$e^{(\rho-\delta)\cdot t} = 0$$

$$e^{(\rho-\delta)\cdot t} = \frac{\rho}{\delta}$$

$$t = \frac{1}{\rho-\delta} \log \frac{\rho}{\delta}$$

Let 
$$h(\delta) = \frac{1}{p-\delta} \cdot \log \frac{p}{\delta}$$

Then

$$\frac{dA}{d5} = \frac{1}{(\rho - 5)^2} \cdot \log \frac{\rho}{5} + \frac{1}{\rho - 5} \cdot \frac{-1}{5}$$
$$= \frac{1}{(\rho - 5)^2} \cdot (\log \frac{\rho}{5} + (\rho - 5) \cdot \frac{-1}{5})$$
$$= \frac{1}{(\rho - 5)^2} \cdot (\log \frac{\rho}{5} - \frac{\rho}{5} + 1)$$
$$\leq 0$$

Hence, the point,  $t=h(\delta)$ , at which  $P(t,\delta)$  becomes minimal is a decreasing function of  $\delta$  (i.e., a increasing function of  $T_0$ ). This means that, when the FP in the preceding trial is larger one, then the value of  $T_0$  is also larger (which is implicitly assumed in assumption 4.),  $\delta$  becomes smaller, and the optimum FP becomes longer. This is the sequential effect ( cf. the results of experiment III).

Now, let U(x) be the distribution function of  $\mathcal{S}$ .

Then,

$$\overline{\mathrm{RT}}(t) = \int_{0}^{\infty} \overline{\mathrm{RT}}(t, \delta) \cdot \mathrm{dU}(\delta)$$
(4-5)

If U(x) is a discrete distribution, eq.(4-5) can be written

as,

$$\overline{RT}(t) = \sum_{i=1}^{n} p_i \cdot \overline{RT}(t, \delta)$$
where  $p_i \ge 0$ ,  $\sum_{i=1}^{n} p_i = 1$ . (4-6)

When the distribution of FPs is discrete, the distributions of  ${\rm T}_0$  and  ${\mathcal S}$  are also discrete by assumption.

In experiment II, six FPs were used. Consider two distributions,  $\{p_{i}^{1}\}_{i=1}^{\delta}$  and  $\{p_{i}^{2}\}_{i=1}^{\delta}$ , and let

$$p_1^1 = p_2^1 = p_3^1 = \frac{2}{9}$$
,  $p_4^1 = p_5^1 = p_6^1 = \frac{1}{9}$ ,

and

$$p_1^2 = p_2^2 = p_3^2 = \frac{1}{9}$$
,  $p_4^2 = p_5^2 = p_6^2 = \frac{2}{9}$ .

Denote  $\overline{RT}(t)$ 's corresponding to  $\{p_i^1\}$  and  $\{p_i^2\}$  as  $\overline{RT}^1(t)$ and  $\overline{RT}^2(t)$ , respectively.

$$\overline{RT}^{1}(t) = \frac{2}{9} \overline{RT}^{a}(t) + \frac{1}{9} \overline{RT}^{b}(t)$$

and

$$\overline{RT}^{2}(t) = \frac{1}{9} \overline{RT}^{a}(t) + \frac{2}{9} \overline{RT}^{b}(t)$$

where

$$\overline{\mathrm{RT}}^{\mathrm{a}}(\mathrm{t}) = \overline{\mathrm{RT}}(\mathrm{t}, \delta_1) + \overline{\mathrm{RT}}(\mathrm{t}, \delta_2) + \overline{\mathrm{RT}}(\mathrm{t}, \delta_3)$$

and

$$RT^{b}(t) = RT(t, \delta_{4}) + RT(t, \delta_{5}) + RT(t, \delta_{6})$$

So,

$$\overline{RT}^{1}(t) - \overline{RT}^{2}(t) = \frac{1}{9} \cdot (\overline{RT}^{a}(t) - \overline{RT}^{b}(t))$$
(4-7)

When  $\delta_i > \delta_j$  for i < j

then the value of t at which  $\overline{RT}^{a}(t)$  becomes minimal is smaller than the one at which  $\overline{RT}^{b}(t)$  becomes minimal, because

$$h(\delta_i) < h(\delta_j)$$
 for  $i < j$ .

Hence, eq.(4-7) means that the value of t at which  $\overline{RT}^{1}(t)$  becomes minimal is smaller than the one at which  $\overline{RT}^{2}(t)$  becomes minimal. This means that the optimum FP depends on the relative

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CHAPTER V

SUMMARY

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A new model of simple reaction time was proposed in this dissertation. In order to recognize the need to propose a new model, literatures on models of choice reaction time were reviewed in the first part of chapter I and literatures on models of simple reaction time were reviewed in the following part. We found that the two-state model of choice reaction time proposed by Falmagne(1965) was simple and successful in predictions. As to models of simple reaction time, there are many models. But, only one of the models reviewed in chapter I incorporated a process of expectancy/anticipation, although the role of expectancy in simple reaction time has been emphasized by Näätänen and his collaborators (Näätänen(1970,1971), Näätänen and Merisalo(1977), Niemi and Näätänen(1981)). However, this anticipation model ignores the sequential effects.

In chapter II, the author reported four experiments, which gave the data needed to construct a new model. In experiments I and II, factors, which seemed to affect the expectancy, were manipulated. Shift of the range of FPs caused shift of the optimum FP. The optimum FP in the case where shorter FPs were

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more often used was shorter than in the case where longer FPs were more often used. In experiements III and IV, the sequential effects were investigated. When the FP in the preceding trial is longer, the reaction time for short FP is longer.

To incorporate a expectation process into a quantitative model, we must adopt a specific model of time perception. Literatures on models of time perception were reviewed in chapter III, but we could not find the model which is accepted by most investigators. We must be content to construct a qualitative model.

In chapter IV, the author proposed the new model of simple reaction time which has the following characteristics;

1) The model is based on the process of expectation.

2) The sequential effects are incorporated.

3) The model is a two-state one.

In computer simulation, the proposed model produced the data which are similar to the data of experiments I and III. Mathematical analysis showed that the proposed model can predict the effects of the FP in the preceding trial and of the relative

# frequencies of FPs.

### APPENDICES

# APPENDIX A

The programs for experiment I.

The program for the Short FPs condition.

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EXI	P•A2	1		
	1:		DIMENSION CANT(10), STTM(10), SBJNM(10), XENDTM(10),	
	2:		* FTT(48), INTVLT(192), ISBT1(48), ISBT2(48),	
	3:		* I SBT3(43), I SBT4(48), FT STK1(24), FT STK2(24)	
	4:		EGUIVALENCE (INTVLT(1), ISET1(1)), (INTVLT(49), ISET2(1)),	
	5:		* (INTVLT(97), ISBT3(1)), (INTVLT(145), ISBT4(1)	`
	6:		DATA ISET1/	<b>′</b>
	7:		* 4, 1, 2, 1, 4, 5, 2, 3, 0, 5, 3, 0,	
	8:		* 0, 5, 1, 2, 3, 2, 4, 3, 5, 4, 0,	
	9:		* 0, 3, 2, 3, 1, 0, 5, 4, 2, 4, 1, 5,	
	10:		* 0, 3, 5, 0, 1, 5, 1, 4, 2, 3, 2, 4/	
	11:		DATA ISBT2/	
	. 12:			
•.		•	* 3, 5, 4, 5, 1, 3, 2, 0, 4, 1, 0, 2,	
	13:			
	14:			
	15:			
	16:		DATA ISET3/	
	17:		* 0, 2, 5, 5, 3, 3, 0, 4, 1, 4, 2, 1,	
	13:		* 5, 0, 2, 1, 2, 4, 5, 0, 3, 1, 3, 4,	
	19:		* 4,0,3,4,1,5,2,3,2,5,0,1,	
	20:		* 5, 4, 4, 5, 2, 2, 0, 3, 1, 1, 3, 0/	
	21:		DATA ISET4/	
	22:		* 1, 4, 3, 1, 4, 2, 0, 2, 5, 3, 0, 5,	
	23:		* 1,4,1,5,3,4,0,0,3,5,2,2,	
	24:		* 2,2,4,3,5,1,1,5,3,4,0,0,	
	25:		* 5, 5, 1, 3, 4, 3, 0, 2, 2, 4, 0, 1/	
	26:			
	27:	С		
	28:		WRITE(2,1010)	
	29:	1010	FORMAT(25(/), 'COMMENT')	
	30:		READ(1, 1011) CMNT	
	31:	1011	FORMAT(10A4)	
	32:		WRITE(2,1000)	
	33:	1000	FORMAT(//'START TIME')	
	34:		FEAD(1, 1001) STTM	
	35:	1001	FORMAT(10A4)	
	36:		WRITE(2,1002)	
	37:	1002	FORMAT(//'SUBJ. NAME')	
	38:		READ( 1, 1003) SBJNM	
	39:	1003	FORMAT(10A4)	
	40:		REWIND 8	
	41:		DO 100 NSSN1=1,4	
	42:		D0 101 NSSN2=1, 4	
	43:		I SSN = (N S SN 1 - 1) * 4 + N S SN 2	
	44:		WRITE(2,2010)ISSN	
		2010	FORMAT('SESSION', I3, 1X, 'READY?')	
	46:		READ( 1, 2000) A	
		2000	FORMAT(A4)	
	43:	_	CALL OUT40(1)	
	49:			
	50:		***** PRE-TRIAL ******	
	51:			
	52:	240	CALL INP40(INES)	
	53:		IF(IRES.E0.0)GO TO 200	

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54:		CALL INTLTM
55:		CALL OUT40(C)
	230	CALL TMR(IICNS, ISEC)
57:	200	IF(I1045.LT.50)G0 TO 230
58:		DO 210 I I = 1.2
59:	202	CALL THE(I 10MS, I SEC)
60:		CALL INP40(IRES)
61:		IF(IRES.NE.0)GO TO 201
62:		IF(I10MS+LT+200)GO TO 202
63:		CALL OUT4C(I)
64:		CALL INTLIM
65:	203	CALL INP40(IEES) -
66:		IF(IRES.EG.C)GO TO 203
67:		CALL OUT40(0)
	201	CALL INTLIM
69:	-	CALL THE(110HS, 1SEC)
	660	IF(I10/15.LT.50)GO TO 220
70:	010	CONTINUE
	210	CONTINCE
72:	C	
73:		******* MAIN TELALS *********
74:	С	/
75:		I STRL= 1
76:	305	ITFL = (NSSN2-1) * 48 + ISTFL
77:		I RSI = 100
78:		NCNTR=INTVLT(ITRL)
79:	311	IF(NCHTR-EQ-2)GO TO 312
80:		IRSI=IFIX(FLOAT(IESI)*1.3)
81:		NCNTR=NCNTR-1
82:		GO TO 311
33:	310	CONTINUE
84:	301	CALL INF40(IRES)
85:		CALL THR(I 10MS, I SEC)
36:		IF(IPES-NE-0)GO TO 300
87:		IF(I10MS.LT.IRSI)GO TO 301
.88:		GO TO 322
89:	300	RTT(ISTEL)=FLOAT(I10MS+1000)*0.01
	36.0	G0 T0 303
90:	302	CALL OUT40(1)
91:	SEE	
92:	0.0.4	CALL INTLTA
93:	304	CALL INP40(IRES)
94:		CALL TMR(II0MS, ISEC)
95:		IF(IRES.EC.0)GO TO 304
96:		RTT(I STRL) = FLOAT(I 10MS) * 0.01
97:	363	CALL OUT40(0)
98:		CALL INTLTA
99:	500	CALL TMR(I 10MS, I SEC)
100:		1F(110MS.LT.50)G0 T0 500
101:		I STRL=I STRL+1
102:		IF(ISTRL.LE.48)GO TO 305
103:		WRITE(2,3300)ISSN
104:	3300	FORMAT('SESSION', I3, IX, 'ENDS.')
105:	С	
106:		******* DATA STACK ROUTINE *********
- /		

EX P • A	.2	1	
107	: C		
168	:	D0 400 II $l = 1.24$	
1 Ø9	:	II2=II1+24	
110	:	RTSTKI(III)=RTT(III)	
111	:	RTSTK2(III) = RTT(II2)	
112	: 400	CONTINUE	
113	:	WRITE(8, 3000) RTSTK 1	
114	: 3000	2 FOFMAT(24F6.2)	
115	:	WRI TE(8, 3000) RTSTK2	
116	: 101	CONTINUE	
117	: 100	CONTINUE .	
·	:	CALL OWARI	•
1 1 9		- WRITE(2,4000)	
120	: 4000	FORMAT(////, 'ALL SESSIONS FINISHED'////	
121	:	<pre>* 'END TIME ?')</pre>	
122	:	READ(1,4001)XENDTM	
123	: 400	I FORMAT(10A4)	
124	:	WEITE(6,4002)CMNT, SEJNM, STTM, XENDTM	
125	: 4002	2 FORMAT(1H1/////5X,10A4//5X, 'NAME OF TH	E SEJ. , 10X, 10A4//
126		*	
127		* 5X, 'END TIME'/10X, 10A4)	
	: C		
	: C	****** PRINT OUT FOUTINE ********	
	: C		
131		REWIND 8	
132		DO $600 \text{ NSSN} 1 = 1.4$	
133		D0 601 NSSN2=1.4	·
134		I S SN= (N S SN 1- 1) * 4+N S SN 2	
135		WEITE(6, 5000) I SSN	
136		the second	OREPERIOD',
137		* 5X, 'REACTION TIME'//)	
138		READ(8, 3000) RT STK 1	
139		READ(8, 3000) RT STX2	
140		D0 602 II 1= 1, 24	
141		II2=III+24	
142		RTT(III) = RTSTKI(III)	
143		RTT(II2)=RTSTK2(II1)	
	: 602	CONTINUE	
145		D0 603 ISTRL=1,48	
146		I STRL 1= (NSSN2-1)*48+I STRL	
140		I RSI = 100	
148		MCNTR=INTVLT(ISTRL1)	
	: 605	IF(NCNTR. EQ. 0) GO TO 604	
150		I RSI = I FIX(FLOAT(I RSI) * 1.3)	
151		NCNTR=NCNTR-1	,
151		GO TO 605	
	: 604	XIRSI=FLOAT(IRSI)*0.01	
		WRITE(6, 5001)XIRSI, RTT(ISTRL)	
154			
	: 500 : 603	CONTINUE	
	: 601	CONTINUE	
	: 600	CONTINUE	
		WRITE(6, 5050)	
159	•	MUTIFICA DEPEN	

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EX P. A2

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160: 5	050 FC	DEMAT (	181////	///////
161:	ST	IOP		
162:	E٢	JD		

The program for the Long FPs condition.

EXP.A3 1 DIMENSION CMNT(10), STTM(10), SBJNM(10), XENDTM(10), 1: 2: \* RTT(48), INTVLT(192), ISBT1(48), ISBT2(48), ISBT3(48), ISBT4(48), RTSTK1(24), RTSTK2(24) 3: \* EQUIVALENCE (INTVLT(1), ISBT1(1)), (INTVLT(49), ISBT2(1)), 4: (INTVLT(97), ISBT3(1)), (INTVLT(145), ISBT4(1)) 5: \* 6: DATA ISBTI/ 7: \* 4, 1, 2, 1, 4, 5, 2, 3, 0, 5, 3, 0, 8: \* 0, 5, 1, 1, 2, 3, 2, 4, 3, 5, 4, 0, 0, 3, 2, 3, 1, 0, 5, 4, 2, 4, 1, 5, 9: \* 0, 3, 5, 0, 1, 5, 1, 4, 2, 3, 2, 4/ \* . . 10: DATA I SBT2/ 11: 5, 2, 4, 4, 3, 1, 5, 3, 1, 0, 0, 2, \* 12: 3, 5, 4, 5, 1, 3, 2, 0, 4, 1, 0, 2, 13: \* 14: \* 1, 0, 3, 3, 5, 4, 5, 4, 0, 2, 2, 1, 3, 4, 1, 1, 0, 2, 5, 4, 3, 2, 5, 0/ 15: \* DATA ISBT3/ 16: 17: \* 0,2,5,5,3,3,0,4,1,4,2,1, 18: 5, 0, 2, 1, 2, 4, 5, 0, 3, 1, 3, 4, \* 4, 0, 3, 4, 1, 5, 2, 3, 2, 5, 0, 1, \* 19: \* 5, 4, 4, 5, 2, 2, 0, 3, 1, 1, 3, 0/ 20: DATA ISBT4/ 21: 1, 4, 3, 1, 4, 2, 0, 2, 5, 3, 0, 5, \* 22: 1, 4, 1, 5, 3, 4, 0, 0, 3, 5, 2, 2, \* 23: 2, 2, 4, 3, 5, 1, 1, 5, 3, 4, 0, 0, \* 24: 5, 5, 1, 3, 4, 3, 0, 2, 2, 4, 0, 1/ ÷ 25: 26: C 27: C CALL DFFILE 28: 29: WRITE(2, 1010) 30: 1010 FORMAT(25(7), 'COMMENT') READ( 1, 1011) CMNT 31: 32: 1011 FORMAT(10A4) WRITE(2, 1000) 33: FORMAT(//'START TIME') 34: 1000 35: READ(1, 1001) STTM FORMAT(10A4) 36: 1001 WRITE(2, 1002) 37: FORMAT(//'SUEJ. NAME') 38: 1002 39: READ(1, 1003) SBJNM 40: 1003 FORMAT(10A4) 41: REWIND 8 DO 100 NSSN1=1.4 42: DO 101 NSSN2=1.4 43: 44: ISSN=(NSSNI-1)\*4+NSSN245: WRITE(2,2010)ISSN FORMAT('SESSION', I3, 1X, 'READY?') 46: 2010 READ( 1, 2000) A 47: 48: 2000 FORMAT(A4) 49: CALL OUT40(1) 50: C 51: C \*\*\*\*\*\* PRE-TRIAL \*\*\*\*\*\* 52: C 53: 200 CALL INP40(IRES)

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EXF	P• A3	1	
	54:		IF(IFES.EG.0)GO TO 200
	55:		CALL INTLIM
	56:		CALL OUT40(0)
		23Ø	CALL TMR(I10MS, ISEC)
	58 <b>:</b>		IF(I10MS.LT.50)GO TO 230
	59 <b>:</b>		DO 210 I 1=1,2
		265	CALL TMR(I10MS, ISEC)
	61:		CALL INF40(IRES)
	62:		IF(IRES.NE.C)GO TO 201
	63:		IF(I1045.LT.500)GO TO 202
	64:		CALL OUT40(1)
	65:		CALL INTLTM
	66:	203	CALL INF4@(IRES)
	67:		IF(IRES.EQ.0)GO TO 203
	63:		CALL OUT40(0)
	69:	201	CALL INTLTM
	70:	220	CALL TMR(II@MS,ISEC)
	71:		IF(I10MS.LT.50)GO TO 220
	72:	210	CONTINUE
	73:		
	74:	C *	****** MAIN TRIALS *********
	75 <b>:</b>	С	
	76:		I STEL= 1
	77:	305	ITRL = (NSSN2-1) * 48 + ISTRL
,	78:		I R S I = 284
	79:		NCNTR=INTVLT(ITRL)
	80:	311	IF(NCNTR.EQ.0)GO TO 310
	81:		IRSI=IFIX(FLOAT(IRSI)*1.2)
	82:		NCNTR=NCNTR-1
	83:		GO TO 311
	84:	310	CONTINUE
	85:	301	CALL INP40(IRES)
	86:		CALL TMR(II@MS,ISEC)
	87:		IF(IRES.NE.0)GO TO 300
· · · ·	88:		IF(I10MS.LT.IRSI)GO TO 301
•	89:		GO TO 302
	90:	300	RTT(ISTRL)=FLOAT(I10MS+1000)*0.01
	91:		GO TO 303
	92:	302	CALL OUT40(1)
	93:		CALL INTLIM
	94:	304	CALL INP40(IRES)
	95:		CALL TMR(I 10MS, I SEC)
	96:		IF(IRES.EC.0)GO TO 304
	97:		RTT(ISTRL)=FLOAT(I1@MS)*@.01
	98:	303	CALL OUT40(0)
	99:		CALL INTLTH
1	100:	500	CALL THR(IIOMS, ISEC)
. 1	101:		IF(I10MS.LT.50)GO TO 500
J	102:		I STRL=I STRL+1
1	103:		IF(ISTRL.LE.48)G0 T0 305
1	04:		WRITE(2,3300)ISSN
1	05:	3300	FOEMAT('SESSION', 13, 1X, 'ENDS.')
	106:	C	

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EXP-A3	1
107:	C ****** DATA STACK ROUTINE ********
108:	
109:	DO $460$ II $1 = 1, 24$
110:	II2 = II1 + 24
111:	RTSTKI(III) = RTT(III)
112:	RTSTK2(III) = RTT(II2)
113:	400 CONTINUE
114:	WRITE(8, 3000) FTSTK1
115:	3000 FOFMAT(24F6.2)
116:	WEITE(8, 3000) ETSTX2
117:	101 CONTINUE
113:	100 CONTINUE
119:	CALL OWARI
120:	WF1TE(2,4000)
121:	4000 FORMAT(////, 'ALL SESSIONS FINISHED'////
122:	* 'END TIME ?')
123:	READ(1,4001)XENDTM
124:	4001 FORMAT(10A4)
125:	WRITE(6,4002)CMNT, SBJNM, STTM, XENDTM
126:	4002 FOFMAT(1H1/////5X, 10A4//5X, 'NAME OF THE SEJ.', 10X, 10A4//
127:	* 5X, 'START TIME'/10X, 10A4//
128:	* 5X, 'END TIME'/10X, 10A4)
129:	
130:	
131:	
132:	REWIND 8
133:	DO 600 NSSN 1= 1, 4
134:	D0  601  NSSN 2= 1, 4
135:	I SSN = (N SSN 1 - 1) * 4 + N SSN 2
136:	WRITE(6,5000)ISSN 5000 FORMAT(1H1,5X,'SESSION NO. IS',I3//5X,'FOREPERIOD',
138:	* 5X, 'REACTION TIME'//) READ(8,3000)RTSTK1
139:	READ(8, 3000) RTSTK2
140:	D0 602 II 1=1, 24
141: 142:	II 2= II 1+ 24
142:	
144:	RTT(112) = RTSTK2(111)
	602 CONTINUE
146:	DO 603 I STPL = 1,48
147:	I STRL = (NSSN2-1)*43+I STRL
148:	I RSI = 284
149:	NCNTR=INTVLT(ISTRL1)
150:	
151:	IRSI=IFIX(FLOAT(IRSI)*1.2)
152:	N CN T R= N CN T R- 1
153:	GO TO 605
154:	604 XIRSI=FLOAT(IRSI)*0.01
155:	WRITE(6, 5001)XIRSI, RTT(ISTRL)
156:	5001 FORMAT(4X, F5.2, 'SEC.', 7X, F7.2, 'SEC.')
	603 CONTINUE
158:	
159:	600 CONTINUE

EXP-A3

160:		WRITE(6,5050)
161:	5050	FORMAT(1H1/////////////
162:		STOP
163:		END

## APPENDIX B

The programs for experiment II.

The program for S-L condition.

EX P • E 1 1

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1:		
2:		****** MAIN PROGRAM ******
3:	С	
4:		DIMENSION INTVLT(400).
5:		* ISBT1(100), ISBT2(100), ISBT3(100), ISBT4(100)
6:		EQUIVALENCE (INTVLT(1), ISBT1(1)), (INTVLT(101), ISBT2(1)),
7:		<pre>* (INTVLT(201), ISBT3(1)), (INTVLT(301), ISBT4(1))</pre>
S:		DATA ISET 1/
9:		* 1, 2, 9, 9, 3, 8, 7, 6, 6, 3, 4, 0, 5, 4, 0, 7, 2, 5, 8, 1,
10:		* 3, 4, 7, 5, 2, 1, 7, 9, 0, 2, 6, 8, 5, 3, 9, 4, 8, 6, 1, 0,
11:		* 2, 2, 9, 6, 7, 4, 1, 5, 9, 5, 6, 8, 4, 3, 3, 1, 8, 6, 7, 0,
12:		* 9, 3, 2, 5, 7, 8, 5, 2, 0, 3, 7, 0, 8, 1, 6, 9, 6, 1, 4, 4,
13:		* 8, 1, 2, 0, 4, 6, 7, 9, 1, 3, 5, 7, 4, 6, 0, 3, 9, 2, 5, 8/
14:		DATA ISBT2/
15:		* 4,8,5,6,0,5,9,7,0,3,9,7,3,1,2,4,2,1,8,6,
16:		* 8,2,0,9,3,5,7,1,9,1,0,8,2,5,4,3,4,7,6,6,
17:		* 4, 7, 5, 2, 9, 6, 0, 4, 1, 8, 3, 5, 9, 6, 8, 0, 3, 7, 2, 1,
18:		* 7,8,0,2,2,6,7,1,5,5,1,5,3,8,9,5,2,1,2,9,
19:		* 4, 8, 0, 5, 9, 1, 3, 6, 7, 1, 0, 6, 2, 8, 7, 5, 3, 4, 9, 2/
20:		
21:		* 1, 7, 7, 9, 4, 6, 3, 5, 3, 0, 2, 9, 1, 2, 5, 6, 4, 0, 8, 8,
22:		* 9 , 6 , 8 , 6 , 7 , 5 , 0 , 0 , 8 , 5 , 4 , 3 , 1 , 7 , 4 , 2 , 1 , 3 , 2 , 9 ,
23:		* 7, 6, 9, 3, 5, 2, 6, 9, 4, 1, 0, 8, 5, 1, 4, 7, 3, 2, 0, 8,
24:		* 1, 4, 0, 0, 6, 8, 3, 3, 5, 8, 7, 1, 2, 9, 2, 7, 4, 5, 6, 9,
25:		* 3, 0, 2, 0, 1, 6, 6, 8, 7, 1, 9, 4, 4, 9, 5, 3, 2, 5, 8, 7/
26:		DATA ISBT4/
27:		* 4,5,9,3,2,1,0,6,3,2,1,4,5,7,8,9,6,0,8,7,
28:		* 1, 6, 4, 2, 3, 2, 3, 5, 0, 6, 5, 4, 0, 9, 7, 8, 1, 9, 7, 8,
29:		* 6, 4, 6, 4, 7, 8, 0, 5, 2, 3, 1, 1, 0, 9, 7, 9, 5, 8, 2, 3,
30:		* 1, 5, 7, 2, 8, 4, 7, 3, 6, 8, 0, 2, 9, 3, 1, 4, 5, 6, 0, 9,
31:	~	* 9, 0, 4, 0, 9, 2, 6, 7, 1, 3, 2, 4, 8, 6, 7, 3, 5, 5, 1, 8/
	C	
33:	C	
34:		CALL DFFILE
35:		CALL SUBI(INTVLT)
36:		CALL SUB2(INTVLT)
37:		STOP
38:		EN D
39:	C .	
40:	С	
	С	***** EXPERIMENT *****
42:		
	C	SUBROUTINE SUBICINTVLT)
43:	c	SUBRUUTINE SUBICINIVE/
44:	C	
45:		DIMENSION INTULT(400), CMNT(10), STTM(10), SEJNA(10), XENDTM(12)
46:		* RTT(100)
47:		WRITE(2, 1010)
	1010	FOFMAT(25(/), 'COMMENT')
49:		READ(1, 1011) CMNT
50:	1011	FORMAT(10A4)
51:		WRITE(2, 1000)
	1000	FORMAT(//'START TIME')
53:		READ(1, 1001) STTM

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EXP.E1

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	1001	FOFMAT(10A4)
55:	1 9 9 9	WEITE(2,1002)
	1065	FORMAT(//'SUBJ. NAME')
57:	1000	READ(1,1003) SEJIM
	1003	FOFMAT(10A4) Rewind 8
59 <b>:</b>		D0 190 NSSN = 1.2
60:		
61:		DO 100 NSSN1=1,3 DO 101 NSSN2=1,4
62:		ISSN=(NSSN@-1)*12+(NSSN1-1)*4+NSSN2
63:		VRITE(2, 2010) I SSN -
64:	2010	FOFMAT('SESSION', I3, IX, 'READY?')
65: 66:	2010	READ(1,2000) A
		FORMAT(A4)
	2606	CALL OUT40(1)
.68: 69:	С	CREE OUTVECTV
		**** PRE-TRIAL ******
	۳÷، ۲ С	adada 1971 1991 HPP secondary
	200	CALL INF40(IRES)
73:	225	IF(IRES.EQ.C)GO TO 200
74:		CALL INTLIM
75:		CALL OUT40(0)
	230	· · · · · · · · · · · · · · · · · · ·
77:	2.010	IF(110MS.LT.50)G0 TO 230
78:		D0 210 $1 = 1 \cdot 2$
	202	CALL TMR(110MS, ISEC)
80:	666	IF(I1045.LT.50)G0 TO 202
81:		CALL INP40(IRES)
82:		IF(IRES-NE-0)GO TO 201
83:		IF(I10MS.LT.200)G0 TO 202
84:		CALL OUT40(1)
	203	CALL INP40(IRES)
86:	200	IF(IRES.EQ.Ø)GO TO 203
87:		CALL OUT40(0)
	201	CALL INTLIM
	210	CONTINUE
90:	C	00.11110.8
91:		****** MAIN TRIALS *********
92:	č	
93:	0	I STRL=1
	305	
95:		NCNTR=INTVLT(ITRL)
96:		IF(NSSNØ.EQ.1)CALL STINT1(NCNTR, IRSI)
97:		IF(NSSN@.EQ.2)CALL STINT2(NCNTR, IRSI)
98:	310	CALL TMR(I10MS, ISEC)
99:		IF(I1045.LT.50)GO TO 310
100:	301	CALL INP40(IRES)
101:		CALL THR(II@MS,ISEC)
102:		IF(IRES.NE.@)GO TO 300
103:		IF(I1@MS.LT.IRSI)GO TO 301
104:		GO TO 302
105:	300	RTT(ISTRL)=FLOAT(I1@MS+10@0)*@.01
106:		GO TO 303

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Ð	(P+B1	1	
	107:	302	CALL OUT40(1)
	108:		CALL INTLTM
	109:	324	CALL INF40(IRES)
	110:		CALL TMR(I10MS,ISEC)
	111:		IF(IRES.EG.C)GO TO 304
	112:		RTT(ISTEL)=FLOAT(I10MS)*0.01
	113:	303	CALL OUT40(0)
	114:		CALL INTLTM
	115:		I STEL=I STEL+1
	116:	•	IF(ISTPL.LE.100)G0 TO 305
			WRITE(2, 3300) I SSN
	117:		
		3300	FORMAT('SESSION', I3, IX, 'ENDS.')
	119:		
	120:		***** DATA STACK ROUTINE ********
	121:	С	
	122:	,	WRITE(S)RTT
	123:	101	CONTINUE
	124:	100	CONTINUE
	125:	190	CONTINUE
	126:		CALL OWARI
	127:		VRITE(2,4000)
			FORMAT(////, 'ALL SESSIONS FINISHED'////
	129:		* 'FND TIME ?')
	130:		READ(1,4001)XENDTM
			FORMAT(10A4)
	132:	4001	WRITE(6,4002) CMNT, SEJNM, STTM, XENDTM
	-	14889	FORMAT(1H1/////5x, 10A4//5x, 'NAME OF THE SEJ.', 10X, 10A4//
	134:		* 5X, 'START TIME'/10X, 10A4//
	135:		* 5X, 'END TIME'/10X, 10A4)
- <b>3</b> , - *			· SAY END THE / TEAY TER4/
	136:		***** PRINT OUT ROUTINE
	137:		AAAAAAA FAINI UUI AUUTINE AAAAAAAA
	138:		
	139:		REWIND 8
	140:		D0 $690$ NSSN $0=1,2$
	141:		D0 600 NSSN 1= 1, 3
	142:	ана (Х.), с	D0 601 NSSN2=1.4
	143:		I SSN=(NSSN@-1)*12+(NSSN1-1)*4+NSSN2
	144:		WRITE(6, 5000) I SSN
	145:	5000	FORMAT(IH1, 5X, 'SESSION NO. IS', I3//5X, 'FOREPERIOD',
	146:	,	* 5X, 'REACTION TIME'//)
	147:		READ(8) RTT
	148:		DO $603$ I STRL= 1, 100
	149:		I STRL I = (NSSN 2 - 1) * 100 + I STRL
	150:		NCNTR=INTVLT(ISTRL1)
	151:		IF(NSSN0.EG.1)CALL STINTI(NCNTR, IRSI)
	152:		IF(NSSNØ.EC.2)CALL STINT2(NCNTR,IRSI)
	153:		XIRSI=FLOAT(IRSI)*Ø.01
	154:		WRITE(6, 5001)XIRSI, RTT(ISTRL)
		5001	FORMAT(4X, F5.2, ' SEC.', 7X, F7.2, ' SEC.')
	156:		CONTINUE
	157:		CONTINUE
	158:		CONTINUE
	159:		CONTINUE

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EXP.B1 1 WRITE(6, 5050) 160: 161: 5050 162: RETUEN 163: END 164: C 165: C 166: C \*\*\*\*\* SET INTERVAL \*\*\*\*\*\*\* 167: C 168: SUEROUTINE STINTI(NCNTR, IRSI) 169: C 170: IF(NCNTR\*(NCNTR-1)\*(NCNTR-2) . EQ. 0) IRSI=100 171:  $IF(NCNTR \cdot EC \cdot 3) IRSI = 130$ 172: IF((NCNTE-4)\*(NCNTE-5)\*(NCNTE-6).EC.C)IESI=169  $IF(NCNTR \cdot EQ \cdot 7) IRSI = 219$ 173: 174:  $IF(NCNTR \cdot EQ \cdot 8) IRSI = 284$ 175:  $IF(NCNTR \cdot E0 \cdot 9) IRSI = 369$ 176: RETURN 177: END 178: C 179: C 180: C \*\*\*\*\*\* SET INTERVAL \*\*\*\*\*\*\*\* 131: C SUPROUTINE STINT2(NCNTR, IRSI) 182: 183: C  $IF(NCNTR \cdot EQ \cdot \emptyset) IRSI = 100$ 184: 185:  $IF(NCNTR \cdot EC \cdot 1) IRSI = 130$ 186:  $IF(NCN.TR \cdot EQ \cdot 2)IRSI = 169$ IF((NCNTR-3)\*(NCNTR-4)\*(NCNTR-5) • EQ • @) IESI=219 187:  $IF(NCNTR \cdot EQ \cdot 6) IRSI = 284$ 188: 189:  $IF((NCNTR-7)*(NCNTR-8)*(NCNTR-9) \cdot EC \cdot C) IRSI=369$ 190: RETURN 191: END 192: C 193: C ARRANGE DATA 194: C \*\*\*\*\*\* \*\*\*\*\* 195: C SUBROUTINE SUB2(INTVLT) 196: 197: C 198: DIMENSION INTVLT(400), RTT(100), ERT0(10), RET1(10), ERT2(10), 199: RRT3(10), ERT4(10), RRT5(10), RRT6(10), \* 200: RRT7(10), RRT8(10), RRT9(10) 201: C REVIND 8 565: WRITE(6,1000) 203: 204: 1000 FORMATCIH1, 5X, 'DATA ARRANGED'//////) DO 102 ISTP0=1,2 205: DO 100 ISTP1=1,3 206: D0 101 ISTP2=1,4 207: NSSN=(ISTP0-1)\*12+(ISTP1-1)\*4+ISTP2 208: 209: WRITE(6,2000)NSSN 210: 2000 FORMAT(10X, 'SESSION NO. IS ',15/// 5X, '( @ ) ', 6X, '( 1 ) ', 6X, '( 2 ) ', 6X, '( 3 ) ', , \* 211: 6X, '( 4 ) ', 6X, '( 5 ) '/ 212: ×

EXP.B1	1	
213:		* 8X, '( 6 )', 6X, '( 7 )', 6X, '( 8 )', 6X, '( 9
214:	,	READ(8) RTT
215:		NO @= Ø
216:		NO 1= Ø
217:		N0 2= Ø
218:		NO 3= Ø
210:		NO 4= Ø
220:		NO 5= Ø
		NO 6= 0
221:		NO 7= Ø
222:		108=Ø
223:		-
224:		$NO9 = \emptyset$
225:		D0  300  I = 1, 100
226:		ITRL=(ISTP2-1)*100+I1
227:		NTRCK=INTVLT(ITRL)
228:		RT = RTT(I   I)
229;		IF(NTECK · EC · 9) GO TO 39 Ø
230:		IF(NTRCK.EG.8)GO TO 380
231:		IF(NTRCX • EQ • 7) GO TO 370
232:		IF(NTRCK.EQ.6)GO TO 366
233:		IF(NTRCK · EQ · 5) GO TO 350
234:		IF(NTRCK.EC.4)GO TO 340
235:		IF(NTRCK+EQ+3)GO TO 330
236;		IF(NTRCK.EQ.2)G0 T0 320
237:		IF(NTRCK.EG.1)GO TO 310
238:		100 = 100 + 1
239.:		RTC(NOC) = RT
240:		GO TO 360
241:	39 Ø	N09=N09+1
242:		ERT9(N09)=RT
243:		GO TO 360
244:	38 Ø	N08=N08+1
245:		RRT8(NO8)=RT
246:		GO TO 360
247:	370	NO 7=NO 7+ 1
243:		RRT7(N07) = RT
249:		GO TO 360
250:	366	N06=N06+1
251:		ERT6(NO6) = RT
252:		GO TO 360
253:	350	N0 5= N0 5+ 1
254:		RT5(NO5) = RT
255:		GO TO 360
256:	340	NO 4=NO 4+ 1
257:		RRT4(NO4) = RT
258:		GO TO 360
259:	33Ø	NO 3= NO 3+ 1
260:		RRT3(NO3) = RT
261:		GO TO 360
262:	32Ø	N02=N02+1
263:		RRT2(NO2) = RT
264:		GO.TO 360
265:	310	NO 1=NO 1+ 1

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EXP-B1	1	
266:		RRT1(N01)=RT
267:	360	CONTINUE
268:	300	CONTINUE
269:		D0 $400$ I l= 1, 10
270:		WRITE(6,4000)RRT0(11),RRT1(11),RRT2(11),RRT3(11),
271:		* RRT4(11), RRT5(11), RRT6(11), RRT7(11),
272:	-	* ERTS(11), ERT9(11)
273:	4000	FORMAT(5X, F6.2, 5(6X, F6.2)/2X, 4(6X, F6.2))
274:	400	CONTINUE
275:		WRITE(6,4001)
276:	4001	FORMAT(//////)
277:	101	CONTINUE
278:	100	CONTINUE
279:	102	CONTINUE
28 Ø:		WRITE(6,4400)
· 231:	4400	FOEMAT(1H1///////////////////////////////////
282:		RETURN
283:		END

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The program for L-S condition.

	EXP•E2	1	
*	1:		
	2:		****** MAIN FROGRAM *******
	3:	С	
	4:		DIMENSION INTVLT(400),
	5:		* I SET1(100), I SET2(100), I SET3(100), I SET4(100)
	6:		EGUIVALENCE (INTVLT(1), ISET1(1)), (INTVLT(101), ISET2(1)),
	7:		* (INTVLT(201), ISET3(1)), (INTVLT(301), ISET4(1))
	8:		DATA ISETI/
	9:		* 1, 2, 9, 9, 3, 8, 7, 6, 6, 3, 4, 0, 5, 4, 0, 7, 2, 5, 8, 1,
	10:		* 3, 4, 7, 5, 2, 1, 7, 9, 0, 2, 6, 8, 5, 3, 9, 4, 8, 6, 1, 0,
	11:		* 2, 2, 9, 6, 7, 4, 1, 5, 9, 5, 6, 8, 4, 3, 3, 1, 8, 0, 7, 0,
	12:		* 9, 3, 2, 5, 7, 8, 5, 2, 0, 3, 7, 0, 8, 1, 6, 9, 6, 1, 4, 4,
	13:		* 8, 1, 2, 0, 4, 6, 7, 9, 1, 3, 5, 7, 4, 6, 0, 3, 9, 2, 5, 8/
	14:		DATA ISBT2/
	15:		* 4,8,5,6,0,5,9,7,0,3,9,7,3,1,2,4,2,1,8,6,
	16:		* 8, 2, 0, 9, 3, 5, 7, 1, 9, 1, 0, 8, 2, 5, 4, 3, 4, 7, 6, 6,
	17:		* 4, 7, 5, 2, 9, 6, 0, 4, 1, 8, 3, 5, 9, 6, 8, 0, 3, 7, 2, 1, * 7, 8, 0, 4, 0, 2, 6, 7, 1, 6, 5, 1, 5, 3, 8, 9, 3, 4, 2, 9,
	18: 19:		* 4, 8, 0, 5, 9, 1, 3, 6, 7, 1, 0, 6, 2, 8, 7, 5, 3, 4, 2, 9, 2/
	20:		DATA I SET3/
	20:		* 1,7,7,7,9,4,6,3,5,3,0,2,9,1,2,5,6,4,0,8,8,
	22:		* 9, 6, 8, 6, 7, 5, 0, 0, 8, 5, 4, 3, 1, 7, 4, 2, 1, 3, 2, 9,
	23:		* 7, 6, 9, 3, 5, 2, 6, 9, 4, 1, 0, 8, 5, 1, 4, 7, 3, 2, 0, 8,
	24:		* 1, 4, 0, 0, 6, 8, 3, 3, 5, 8, 7, 1, 2, 9, 2, 7, 4, 5, 6, 9,
	25:		* 3, 0, 2, 0, 1, 6, 6, 8, 7, 1, 9, 4, 4, 9, 5, 3, 2, 5, 8, 7/
	26:		DATA ISBT4/
	27:		* 4, 5, 9, 3, 2, 1, 0, 6, 3, 2, 1, 4, 5, 7, 8, 9, 6, 0, 8, 7,
	28:		* 1, 6, 4, 2, 3, 2, 3, 5, 0, 6, 5, 4, 0, 9, 7, 8, 1, 9, 7, 8,
	29:		* 6, 4, 6, 4, 7, 8, 0, 5, 2, 3, 1, 1, 0, 9, 7, 9, 5, 8, 2, 3,
	30:		* 1, 5, 7, 2, 8, 4, 7, 3, 6, 8, 0, 2, 9, 3, 1, 4, 5, 6, 0, 9,
	31:		* 9,0,4,0,9,2,6,7,1,3,2,4,8,6,7,3,5,5,1,8/
	32:	С	
	33:		
	34:	•	CALL DFFILE
	35:		CALL SUBI(INTVLT)
	36:		CALL SUB2(INTVLT)
	37:		STOP
	38:		EN D
	39:	С	
	40:	С	
	41:	С	****** EXFERIMENT *****
	42:	С	
	43:		SUBROUTINE SUBI(INTVLT)
	44:	C	
	45:		DIMENSION INTVLT(400), CMNT(10), STTM(10), SEJNM(10), XENDTM(10)
	46:		* RTT(100)
	47:	1010	WRITE(2,1010)
		1010	
	49:	1011	READ(1,1011)CMNT
		1011	FOEMAT(10A4)
	51:	1000	WRITE(2,1000) FORMAT(///START TIME!)
		1000	
	53:		READ(1, 1001) STTM

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EX P•	B2	1

	54:	1001	FORMAT(10A4)
	55:		WRITE(2,1002)
	56:	1002	FORMAT(//'SUBJ. NAME')
	57:	.*	READ(1,1003) SEJNM
	58:	1003	FORMAT(10A4)
	59:		REWIND 8
	60:	`	D0 190 NSSN0=1,2
	61:		DO 100 NSSN1=1,3
	62:		DO 101 NSSN 2= 1, 4
	63:		I 5 SN= (N 5 SN (2-1) * 12+ (N 5 SN 1-1) * 4+ N 5 SN 2
	64:		WRITE(2,2010)ISSN
·	65:	2010.	FORMAT('SESSION', I3, 1X, 'READY?')
	66:	LUIO	READ(1,2000)A
	67:	2000	FORMAT(A4)
	68:	LLUU	CALL OUT40(1)
	69:	С	CALL OCIAC(I)
	70:		**** PRE-TRIAL ******
	71:	C ***	AAAAA FAL INIEL ATTATA
			CALL IND/G(IDDC)
	72:	200	CALL INP40(IRES)
	73:		IF(IRES.EC.Ø)GO TO 200
	74:		CALL INTLIM
	75:	007	CALL OUT40(0)
		230	CALL TMR(I 10MS, I SEC)
	77:		IF(I10MS.LT.50)GO TO 230
	78:		DO 210 I 1= 1, 2
	79 <b>:</b>	202	CALL THR(II0MS, ISEC)
	80:	÷	1F(11045.LT.50)GO TO 202
	81:		CALL INP40(IRES)
	82:		IF(IRES-NE-C)GO TO 201
	83:		IF(I10MS.LT.200)G0 TO 202
	84:		CALL OUT40(1)
	85:	203	CALL INP40(IRES)
	86:		IF(IRES-EQ-0)GO TO 203
	87:		CALL OUT40(0)
	88:	201	CALL INTLIM
	89:	210	CONTINUE
	90:	С	
	91:	C **	****** MAIN TRIALS *********
	92:	С	
	93:		I STRL= I
	94:	305	ITRL=(NSSN2-1)*100+1STRL
	95:		NCNTR=INTVLT(ITRL)
	96:		IF(NSSN@.EG.1)CALL STINT2(NCNTR, IRSI)
	97:		IF(NSSNØ.EQ.2)CALL STINTI(NCNTR, IPSI)
	98:	310	CALL TMR(I10MS, ISEC)
	99:		IF(I10MS.LT.50)GO TO 310
	100:	301	CALL INF40(IRES)
	101:		CALL TMR(II@MS,ISEC)
	102:		IF(IRES.NE.@)GO TO 300
	103:		IF(I10MS.LT.IRSI)GO TO 301
	104:		GO TO 302
	105:	300	RTT(ISTRL)=FLOAT(I10MS+1000)*0.01
	106:		GO TO 303

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EXP.B2 1 CALL OUT40(1) 107: 302 128: CALL INTLIM 109: 304 CALL INP4@(IRES) 110: CALL TMR(I LEMS, ISEC) IF(IEES.EG.0)GO TO 304 111: RTT(ISTRL)=FLOAT(I10MS)\*0.01 112: 113: 303 CALL OUT40(0) CALL INTLIM 114: I STFL=I STRL+1 115: IF(ISTRL.LE. 100) GO TO 305 116: WRITE(2, 3300) I SSN 117: 118: 33PE FORMAT("SESSION", 13, 1X, 'ENDS. ') 119: C 120: C \*\*\*\*\*\* DATA STACK ROUTINE \*\*\*\*\*\*\*\*\* 121: C 122: WRITE(8) RTT CONTINUE 123: 101 CONTINUE 124: 100 125: 190 CONTINUE 126: CALL OWARI WEITE(2,4000) 127: 128: 4000 FOFMAT(////, 'ALL SESSIONS FINISHED'//// 'END TIME ?') 129: \* READ(1,4001)XENDTM 130: 131: 4001 FORMAT(10A4) WEITE(6, 4002) CMNT, SEJNM, STTM, XENDTM 132: 133: 4002 FORMAT(IH1/////5X, 10A4//5X, 'NAME OF THE SBJ.', 10X, 10A4// 5X, 'STAET TIME'/10X, 10A4// 134: \* 5X, 'END TIME'/10X, 10A4) \* 135: 136: C FRINT OUT ROUTINE \*\*\*\*\* 137: C \*\*\*\*\*\* 138: C REVIND 8 139: 140: DO 690 N55N0=1,2 DO 600 NSSN1=1.3 141: D0 601 NSSN2=1,4 142: ISSN=(MSSN0-1)\*12+(MSSN1-1)\*4+MSSN2 143: WRITE(6, 5000) I SSN 144: FOEMATCIH1, 5X, 'SESSION NO. IS', I3//5X, 'FOREPERIOD', 145: 5000 5X, 'REACTION TIME'//) 146: \* 147: READ(8) RTT 148: DO 603 ISTIL=1,100 149: 1 ST11.1= C15502-1) \* 107+1 STRL NCUTE=INTVLT(ISTELD) 150: IF(NSSNØ.EC.1)CALL STINT2(NCNTR, IRSI) 151: 152: IF(NSSN@, EC.2)CALL STINTI(NCNTR, IRSI) XIFSI=FLOAT(IESI)\*0.01 153: WEITE(6, 5001)XIRSI, RTT(ISTEL) 154: 155: 5001 FORMAT(4X, F5.2, ' SEC. ', 7X, F7.2, ' SEC. ') 156: 603 CONTINUE 157: 601 CONTINUE 158: 600 CONTINUE 159: 690 CONTINUE

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EXP. BS	2 1	
160:		WFITE(6,5050)
	5050	FOFMAT(1H1///////)
162:		RETURN
163:		END
164:		
165:		
166:		***** SET INTERVAL ******
167:		
168:		SUBFOUTINE STINTI(NCNTR, IRSI)
169:		
170:		$IF(NCNTE*(NCNTE-1)*(NCNTE-2) \cdot EC \cdot C)IESI = 1CC$
171:		$IF(NCNTF \cdot EC \cdot 3)IFSI = 13C$
172:		IF((NCNTE-4)*(NCNTE-5)*(NCNTE-6).E0.0)IRSI=169
173:		1 F(NCNTE + EQ + 7) I FSI = 219
174:		$IF(NCNTR \cdot EQ \cdot B) IFSI = 284$
175:		$IF(NCNTR \cdot EC \cdot 9) IRSI = 369$
176:		RETURN
177:		END
178:		
179:		
186:		***** SET INTERVAL ******
181:		
182:		SUBROUTINE STINT2(NCNTR, IRSI)
		SUBROUTINE STINTZ(NONTR) IRST)
183:		
184:		$IF(NCNTR \cdot EG \cdot O) IRSI = 100$
185:		$IF(NCNTE \cdot EC \cdot I) IRSI = 130$
186:		$IF(NCNTR \cdot EQ \cdot 2)IFSI = 169$
187:		IF((NCNTP-3)*(NCNTR-4)*(NCNTR-5).EC.0)IRSI=219
188:		$IF(NCNTR \cdot EQ \cdot 6)IRSI = 284$
189:		$IF((NCNTR-7)*(NCNTR-8)*(NCNTR-9) \cdot EQ \cdot Q) IRSI = 369$
19 0:		RETUEN
191:		EN D
192:	С	
193:	С	
194:		******* ARRANGE DATA **********
195:		
196:		SUEROUTINE SUB2(INTVLT)
19 7:		Solitoring Selection of the
198:		DIMENSION INTVLT(400), ETT(100), RRT0(10), RET1(10), RET2(10),
199:		* RRT3(10), RRT4(10), RRT5(10), RRT6(10),
200:		* RRT7(10), RRT8(10), RRT9(10)
201:	L L	
202:		REWIND 8
203:		WRITE(6, 1000)
		FORMAT(IHI, 5X, 'DATA ARRANGED'//////)
205:		DO 102 ISTF0=1.2
206:		D0 100 ISTP1=1.3
207:		D0 101 ISTF2=1,4
208:		NSSN=(ISTPØ-1)*12+(ISTP1-1)*4+ISTP2
209:		WRITE(6,2000)NSSN
		FORMAT(10X, 'SESSION NO. IS ', 15///
211:		* 5X,'(0)',6X,'(1)',6X,'(2)',6X,'(3)',
212:		* 6X, '(4)', 6X, '(5)'/
5.5.		

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- 4

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<pre>213: * 3X,'( 6 )', 6X,'( 7 )', 6X,'( 8 )', 6X,'( 9 ) 214: READ(8) FTT 215: N00=0 216: N01=0 217: N02=0 218: N03=0 219: N04=0 220: N05=0 221: N06=0 222: N07=0 222: N07=0 222: N07=0 222: N07=0 222: N08=0 224: N09=0 225: D0 306 11=1,108 226: ITRL=(ISTF2-1)*100*11 227: NTRCK=INTVLT(ITPL) 228: RT=RTT(1) 229: IF(NTRCK-EC.9) 60 T0 390 230: IF(NTRCK-EC.6) 60 T0 380 231: IF(NTRCK-EC.6) 60 T0 380 231: IF(NTRCK-EC.6) 60 T0 380 232: IF(NTRCK-EC.6) 60 T0 380 233: IF(NTRCK-EC.6) 60 T0 380 234: IF(NTRCK-EC.9) 60 T0 380 235: IF(NTRCK-EC.6) 60 T0 380 236: IF(NTRCK-EC.6) 60 T0 380 237: IF(NTRCK-EC.9) 60 T0 310 238: N00=N00+1 239: RT7(N00)=RT 240: G0 T0 360 241: 390 N08=N08+1 243: G0 T0 360 244: 380 N08=N08+1 245: RRT8(N08)=RT 246: G0 T0 360 247: 370 N07=N07+1 248: RRT7(N07)=RT 240: G0 T0 360 247: 370 N07=N07+1 248: RRT7(N07)=RT 249: G0 T0 360 250: 366 N06=N05+1 251: RRT6(N06)=RT 252: G0 T0 360 253: 350 N05=N05+1 254: RRT5(N05)=RT 255: G0 T0 360 255: RRT5(N05)=RT 255: RRT5(N</pre>	•//>
2 15: $100 e^{0}$ 2 16: $N0 1 = 0$ 2 17: $N0 2 = 0$ 2 18: $N0 3 = 0$ 2 19: $N0 4 = 0$ 2 20: $N0 5 = 0$ 2 21: $106 = 0$ 2 22: $N0 7 = 0$ 2 23: $N0 8 = 0$ 2 24: $N0 9 = 0$ 2 25: $D0 30 0 c 1 = 1, 10 0$ 2 26: $1TRL = (1 STP2 - 1) * 10 0 + 11$ 2 27: $NTRCK = INTVLT(1 TPL)$ 2 28: $R^{-} RT^{-}(T1)$ 2 29: $IF(NTRCK - E0 + 9) 60 T0 39 0$ 2 30: $IF(NTRCK - E0 + 9) 60 T0 35 0$ 2 31: $IF(NTRCK - E0 + 9) 60 T0 35 0$ 2 31: $IF(NTRCK - E0 + 9) 60 T0 35 0$ 2 31: $IF(NTRCK - E0 + 9) 60 T0 34 0$ 2 32: $IF(NTRCK - E0 + 3) 60 T0 34 0$ 2 34: $IF(NTRCK - E0 + 3) 60 T0 34 0$ 2 35: $IF(NTRCK - E0 + 3) 60 T0 34 0$ 2 36: $IF(NTRCK - E0 + 3) 60 T0 32 0$ 2 37: $IF(NTRCK - E0 + 3) 60 T0 31 0$ 2 36: $N0 0 = 10 0 + 1$ 2 39: $RTE(N 0 0) = RT$ 2 40: $G0 T0 36 0$ 2 44: $38 0 N08 = N08 + 1$ 2 42: $RT9(N 09) = RT$ 2 43: $G0 T0 36 0$ 2 44: $38 0 N08 = N08 + 1$ 2 45: $RT5(N 08) = RT$ 2 46: $G0 T0 36 0$ 2 44: $37 0 N07 = N07 + 1$ 2 49: $C0 T0 36 0$ 2 44: $ST7(N 07) = FT$ 2 49: $C0 T0 36 0$ 2 44: $RT7(N 07) = FT$ 2 49: $C0 T0 36 0$ 2 50: $366 N06 = N06 + 1$ 2 51: $RT7(N 07) = FT$ 2 49: $C0 T0 36 0$ 2 53: $350 N05 = N05 + 1$ 2 54: $RT5(N 05) = RT$ 2 55: $G0 T0 36 0$	
216: N01=0 217: N02=0 218: N03=0 219: N04=0 220: N05=0 221: N06=0 222: N07=0 223: N08=0 224: N09=0 225: D0 300 I1=1.100 226: ITEL=(ISTP2-1)*100+I1 227: NTECK=INTULT(ITEL) 228: RT=RTT(I) 229: IF(NTRCK-E0.9) C0 T0 390 230: IF(NTRCK-E0.9) C0 T0 370 231: IF(NTRCK-E0.9) C0 T0 350 231: IF(NTRCK-E0.9) C0 T0 350 231: IF(NTRCK-E0.4) C0 T0 350 234: IF(NTRCK-E0.4) C0 T0 350 234: IF(NTRCK-E0.4) C0 T0 340 235: IF(NTRCK-E0.4) C0 T0 310 236: IF(NTRCK-E0.2) C0 T0 310 237: IF(NTRCK-E0.1) C0 T0 310 238: N00=N00+1 249: G0 T0 360 241: 390 N09=N09+1 242: RRT9(N09)=RT 242: RT5(N06)=RT 244: 330 N08=N08+1 245: RT5(N06)=RT 246: G0 T0 360 241: 370 N07=N07+1 246: G0 T0 360 241: 370 N07=N07+1 249: G0 T0 360 241: 370 N07=N7+1 249: G0 T0 360 241: 370 N05=NT 249: G0 T0 360 241: 370 N05=NT 251: G0 T0 360 251: 350 N05=NT 252: G0 T0 360 251: 350 N05=NT 251: G0 T0 360	
217: $NO 2= 0$ 218: $NO 3= 0$ 219: $NO 4= 0$ 220: $NO 5= 0$ 221: $NO 6= 0$ 222: $NO 7= 0$ 223: $NO 8= 0$ 224: $NO 9= 0$ 225: $DO 30 0$ $1 1= 1, 10 0$ 226: $ITRL=(ISTF2-1)*10 0$ 227: $NTRCK=INTULT(ITRL)$ 228: $RT=RTT(I)$ 229: $IF(NTRCK-E0.9) CO TO 39 0$ 230: $IF(NTRCK-E0.9) CO TO 37 0$ 230: $IF(NTRCK-E0.7) CO TO 37 0$ 231: $IF(NTRCK-E0.6) CO TO 36 0$ 231: $IF(NTRCK-E0.6) CO TO 36 0$ 232: $IF(NTRCK-E0.6) CO TO 36 0$ 233: $IF(NTRCK-E0.6) CO TO 36 0$ 234: $IF(NTRCK-E0.6) CO TO 32 0$ 235: $IF(NTRCK-E0.1) CO TO 31 0$ 236: $NO 0=NO 0+1$ 239: $RT 0(NO 0) = RT$ 240: $GO TO 36 0$ 241: $39 0$ $NO 9=NO 9+1$ 242: $RTP (NO 9) = RT$ 243: $GO TO 36 0$ 244: $38 0$ $NO 6=NO 8+1$ 245: $RTT 8(NO 6) = RT$ 246: $GO TO 36 0$ 244: $37 0$ $NO 7=NO 7+1$ 246: $GO TO 36 0$ 247: $37 0$ $NO 7=NO 7+1$ 249: $GO TO 36 0$ 250: $366$ $NO 6=NO 6+1$ 251: $RTK 0(NO 5) = RT$ 251: $RTK 0(NO 5) = RT$ 252: $GO TO 36 0$ 253: $350$ $NO 5=NO 5+1$ 254: $RTS (NO 5) = RT$ 255: $GO TO 36 0$	
218: $NO 3= 0$ 219: $NO 4= 0$ 220: $NO 5= 0$ 221: $NO 6= 0$ 222: $NO 7= 0$ 223: $NO 8= 0$ 224: $NO 9= 0$ 225: $DO 300 I 1=1. 100$ 226: $ITRL=(ISTP2-1)*100 I 12$ 227: $NTRCK=INTVLT(ITRL)$ 228: $RT=RTT(I)$ 229: $IF(NTRCK-E0.9) CO TO 390$ 230: $IF(NTRCK-E0.9) CO TO 370$ 231: $IF(NTRCK-E0.9) CO TO 370$ 232: $IF(NTRCK-E0.9) CO TO 370$ 232: $IF(NTRCK-E0.9) CO TO 360$ 231: $IF(NTRCK-E0.9) CO TO 360$ 233: $IF(NTRCK-E0.9) CO TO 340$ 235: $IF(NTRCK-E0.9) CO TO 340$ 235: $IF(NTRCK-E0.9) CO TO 320$ 237: $IF(NTRCK-E0.9) CO TO 310$ 238: $NO 0=NO 0+1$ 239: $RT0 (NO 0)=RT$ 240: $GO TO 360$ 241: $390 NO 9=NO 9+1$ 242: $RT0 (NO 9)=RT$ 243: $GO TO 360$ 244: $380 NO 8=NO 8+1$ 245: $RTB (NO 8)=RT$ 246: $GO TO 360$ 247: $370 NO 7=NO 7+1$ 249: $GO TO 360$ 247: $370 NO 7=NO 7+1$ 249: $GO TO 360$ 251: $RTT (NO 7)=ET$ 249: $GO TO 360$ 251: $RTS (NO 5)=RT$ 252: $GO TO 360$	
2 19: $N0 4= 0$ 2 20: $N0 5= 0$ 2 21: $N0 6= 0$ 2 23: $N0 8= 0$ 2 24: $N0 9= 0$ 2 25: $D0 300 1 1=1, 100$ 2 26: $ITHL=(ISTF2-1)*100+11$ 2 27: $NTRCK=INTVLT(ITFL)$ 2 28: $RT=RTT(1)$ 2 29: $IF(NTRCK.E0.9) G0 T0 390$ 2 30: $IF(NTRCK.E0.9) G0 T0 370$ 2 30: $IF(NTRCK.E0.7) G0 T0 370$ 2 32: $IF(NTRCK.E0.7) G0 T0 370$ 2 32: $IF(NTRCK.E0.7) G0 T0 370$ 2 32: $IF(NTRCK.E0.7) G0 T0 330$ 2 31: $IF(NTRCK.E0.7) G0 T0 330$ 2 35: $IF(NTRCK.E0.7) G0 T0 320$ 2 36: $IF(NTRCK.E0.7) G0 T0 310$ 2 36: $IF(NTRCK.E0.1) G0 T0 310$ 2 37: $IF(NTRCK.E0.1) G0 T0 310$ 2 38: $N0 0=N0 0+1$ 2 40: $G0 T0 360$ 2 41: 39 0 $N0 9=N0 9+1$ 2 42: $RT9(N0 9)=RT$ 2 42: $RT7(N0 7)=RT$ 2 46: $G0 T0 360$ 2 44: 38 0 $N0 6=N0 6+1$ 2 45: $RT7(N0 7)=RT$ 2 49: $G0 T0 360$ 2 41: $S10 0 =N0 5+1$ 2 49: $G0 T0 360$ 2 44: $S10 0 N0 5=N0 5+1$ 2 52: $G0 T0 360$ 2 53: $350 N0 5=N0 5+1$ 2 55: $G0 T0 360$	
220: N0 5= 0 221: N0 6= 0 222: N0 7= 0 223: N0 8= 0 224: N0 9= 0 225: D0 30 0 I 1= 1, 10 0 226: IT RL= (I ST F2-1) * 10 0+ I 1 227: NT RCK=INTVLT (I T RL) 228: RT= RTT (I 1) 229: IF (NT RCK - E0 + 9) G0 T0 39 0 230: IF (NT RCK - E0 + 9) G0 T0 37 0 231: IF (NT RCK - E0 + 9) G0 T0 37 0 232: IF (NT RCK - E0 + 3) G0 T0 35 0 234: IF (NT RCK - E0 + 3) G0 T0 35 0 234: IF (NT RCK - E0 + 3) G0 T0 34 0 235: IF (NT RCK - E0 + 3) G0 T0 33 0 236: IF (NT RCK - E0 + 3) G0 T0 31 0 238: N0 0 = N0 0 + 1 239: RT 0 (N0 0) = RT 240: G0 T0 36 0 241: 39 0 N0 9 = N0 9 + 1 242: RT 9 (N0 9) = RT 243: G0 T0 36 0 244: 35 0 N0 8 = N0 8 + 1 245: RT 8 (N0 8) = RT 246: G0 T0 36 0 247: 37 0 N0 7 = N0 7 + 1 248: RT 7 (N0 7) = ET 249: G0 T0 36 0 247: 35 0 N0 5 = N0 5 + 1 251: RT 8 (N0 5) = RT 255: G0 T0 36 0 251: 350 N0 5 = N0 5 + 1 255: G0 T0 36 0	
221:       N06=0         222:       N07=0         223:       N08=0         224:       N09=0         225:       D0 300 I 1=1.100         226:       ITEL=(ISTF2-1)*100+11         227:       NTECK=INTVLT(ITEL)         228:       RT=RTT(I)         229:       IF(NTECK-E0.9) GO TO 390         230:       IF(NTECK-E0.9) GO TO 370         231:       IF(NTECK-E0.6) GO TO 370         232:       IF(NTECK-E0.6) GO TO 366         233:       IF(NTECK-E0.4) GO TO 340         235:       IF(NTECK-E0.4) GO TO 330         236:       IF(NTECK-E0.4) GO TO 310         237:       IF(NTECK-E0.2) GO TO 310         238:       N00=N00+1         239:       RET0(N00)=RT         240:       GO TO 360         241:       390         242:       RT9(N09)=RT         243:       GO TO 360         244:       380         255:       GO TO 360         244:       STO 360         245:       RET8(N08)=RT         246:       GO TO 360         247:       370         251:       RET6(N06)=RT         252:       GO TO 360	
222:N07=0223:N08=0224:N09=0225:D0 300 I 1= 1, 100226:ITRL=(ISTF2-1)*100+I 1227:NTRCK=INTVLT(ITEL)228:RT=RT(I)229:IF(NTRCK-E0.9) GO TO 390230:IF(NTRCK-E0.9) GO TO 390231:IF(NTRCK-E0.9) GO TO 370222:IF(NTRCK-E0.6) GO TO 366233:IF(NTRCK-E0.5) GO TO 350234:IF(NTRCK-E0.4) GO TO 340235:IF(NTRCK-E0.2) GO TO 330236:IF(NTRCK-E0.2) GO TO 310237:IF(NTRCK-E0.1) GO TO 310238:N00=N00+1239:RRT0(N00)=RT240:GO TO 360241:390390N03=N08+1242:RRT9(N09)=RT243:GO TO 360244:380380N08=N08+1245:RRT7(N07)=RT246:GO TO 360247:370247:S00250:360251:RHT6(N06)=RT252:GO TO 360253:350254:RRT5(N05)=RT255:GO TO 360	
223: $N08=0$ 224: $N09=0$ 225: $D0$ 300 l l= 1, 100         226: $TTRL=(I STF2-1) * 100 + 11$ 227: $NTRCK=INTVLT(ITPL)$ 228: $RT=RTT(I)$ 229: $IF(NTRCK-E0.9)$ G0 T0 390         230: $IF(NTRCK-E0.9)$ G0 T0 370         231: $IF(NTRCK-E0.6)$ G0 T0 370         232: $IF(NTRCK-E0.6)$ G0 T0 350         234: $IF(NTRCK-E0.6)$ G0 T0 340         235: $IF(NTRCK-E0.2)$ G0 T0 320         236: $IF(NTRCK-E0.2)$ G0 T0 320         237: $IF(NTRCK-E0.2)$ G0 T0 310         238: $N00 = N00 + 1$ 239: $RT0(N00) = RT$ 242: $GO T0 360$ 241:       390         242: $RT7(N009) = RT$ 243: $GO T0 360$ 244:       380         245: $RT6(N06) = RT$ 246: $GO T0 360$ 247:       370         258: $S60 T0 360$ 241:       390         242: $RT5(N05) = RT$ 243: $GO T0 360$ 244:       380	
224: $NO9 = \emptyset$ 225: $DO \ 30\% \ I \ I = I, I \%\%$ 226: $I \ TRL = (I \ STF2 - I) * I \% + I \ I$ 227: $N \ TRCK = I \ NT \ U \ I \ T \ EL$ ) 228: $RT = RTT(I \ I)$ 229: $I \ F(N \ TRCK + EC \ 9) \ GO \ TO \ 39\%$ 230: $I \ F(N \ TRCK + EC \ 9) \ GO \ TO \ 37\%$ 232: $I \ F(N \ TRCK + EC \ 5) \ GO \ TO \ 36\%$ 234: $I \ F(N \ TRCK + EC \ 5) \ GO \ TO \ 34\%$ 235: $I \ F(N \ TRCK + EC \ 5) \ GO \ TO \ 34\%$ 236: $I \ F(N \ TRCK + EC \ 5) \ GO \ TO \ 32\%$ 237: $I \ F(N \ TRCK + EC \ 5) \ GO \ TO \ 32\%$ 238: $NO \ \% \ NO \ 9 \ NO \ 9 \ NO \ 9 \ NO \ 9 \ RT$ 240: $GO \ TO \ 36\%$ 241: $39\% \ NO \ 9 \ NO \ 9 \ NO \ 9 \ RT$ 242: $R \ RT \ 9(NO \ 9) \ = RT$ 242: $R \ TS \ (NO \ 9) \ = RT$ 243: $GO \ TO \ 36\%$ 244: $3\% \ NO \ 9 \ NO \ 9 \ NO \ 9 \ RT$ 245: $R \ TS \ 8(NO \ 8) \ = RT$ 246: $GO \ TO \ 36\%$ 247: $37\% \ NO \ 7 \ NO \ 7 \ 1$ 246: $R \ TS \ (NO \ 8) \ = RT$ 246: $R \ TS \ (NO \ 8) \ = RT$ 246: $R \ TS \ (NO \ 8) \ = RT$ 246: $R \ TS \ (NO \ 8) \ = RT$ 246: $R \ TS \ (NO \ 8) \ = RT$ 246: $R \ TS \ 8(NO \ 8) \ = RT$ 246: $R \ TS \ 8(NO \ 8) \ = RT$ 246: $R \ TS \ 8(NO \ 8) \ = RT$ 247: $37\% \ NO \ 7 \ = NO \ 7 \ 1$ 249: $GO \ TO \ 36\%$ 250: $366 \ NO \ 6 \ 1$ 251: $R \ RT \ 5(NO \ 5) \ = RT$ 255: $GO \ TO \ 36\%$	
225:       D0 30@ I l= 1, 10@         226:       ITFL=(ISTF2-1)*10@+I1         227:       NTRCK=INTVLT(ITEL)         228:       RT=RTT(I)         229:       IF(NTRCK-E0.9)GO TO 39@         230:       IF(NTRCK-E0.9)GO TO 37@         232:       IF(NTRCK-E0.6)GO TO 366         233:       IF(NTRCK-E0.6)GO TO 34@         234:       IF(NTRCK-E0.4)GO TO 34@         235:       IF(NTRCK-E0.2)GO TO 32@         237:       IF(NTRCK-E0.2)GO TO 31@         238:       NO@=NO@+1         239:       RRT@(NO@)=RT         240:       GO TO 36@         241:       39@ NO9=NO9+1         242:       RRT9(NO9)=RT         243:       GO TO 36@         244:       38@ NO8=NO8+1         245:       RRT8(NO8)=RT         246:       GO TO 36@         247:       37@ NO7=NO7+1         248:       RRT7(NO7)=ET         249:       GO TO 36@         251:       RRT6(NO6)=RT         252:       GO TO 36@         251:       RRT6(NO6)=RT         252:       GO TO 36@         253:       350 NO5=NO5+1         253:       S50 NO5=NO5+1	
226:ITEL=(ISTF2-1)*100+I1227:NTRCK=INTULT(ITEL)228:RT=RTT(I)229:IF(NTRCK+EC.9)GO TO 390230:IF(NTRCK+EC.9)GO TO 380231:IF(NTRCK+EC.7)GO TO 370232:IF(NTRCK+EC.5)GO TO 366233:IF(NTRCK+EC.4)GO TO 340235:IF(NTRCK+EC.4)GO TO 320236:IF(NTRCK+EC.1)GO TO 310238:N00=N00+1239:RRT0(N00)=RT240:GO TO 360241:390242:RRT9(N09)=RT243:GO TO 360244:GO TO 360244:GO TO 360247:370246:GO TO 360247:370246:GO TO 360247:370246:GO TO 360247:370250:366250:366250:366250:366251:RRT6(N06)=RT252:GO TO 360253:350350N05=N05+1251:RRT5(N05)=RT255:GO TO 360	
227:NTRCK=INTVLT(ITPL)228:RT=RTT(1)229:IF(NTRCK.EC.9)GO TO 390230:IF(NTRCK.EC.9)GO TO 350231:IF(NTRCK.EC.7)GO TO 370232:IF(NTRCK.EC.7)GO TO 370233:IF(NTRCK.EC.7)GO TO 366233:IF(NTRCK.EC.4)GO TO 340235:IF(NTRCK.EC.3)GO TO 320236:IF(NTRCK.EC.2)GO TO 320237:IF(NTRCK.EC.1)GO TO 310238:NO0=NO0+1239:RRT0(NO0)=RT240:GO TO 360241:390242:RRT9(NO9)=RT243:GO TO 360244:360245:RRT8(NO8)=RT246:GO TO 360247:370370N07=N07+1246:GO TO 360247:370250:366366250:366250:366251:RRT6(NO6)=RT252:GO TO 360253:350350N5=N05+1251:RRT5(NO5)=RT255:GO TO 360	
228: $RT=RTT(11)$ 229:IF(NTRCK.EC.9)GO TO 390230:IF(NTRCK.EC.9)GO TO 380231:IF(NTRCK.EC.7)GO TO 370232:IF(NTRCK.EC.6)GO TO 366233:IF(NTRCK.EC.5)GO TO 350234:IF(NTRCK.EC.4)GO TO 340235:IF(NTRCK.EC.2)GO TO 320236:IF(NTRCK.EC.1)GO TO 310238: $N00=N00+1$ 239: $RRT0(N00)=RT$ 240:GO TO 360241:390242: $RRT9(N09)=RT$ 243:GO TO 360244:380247:370N07=N07+1248: $RRT7(N07)=RT$ 249:GO TO 360250:366250:366250:366250:360251: $RRT6(N06)=RT$ 252:GO TO 360253:350251: $RRT6(N05)=RT$ 252:GO TO 360253:350255:GO TO 360	
229:IF(NTRCK.EG.9)G0 TO 390230:IF(NTRCK.EG.8)G0 TO 350231:IF(NTRCK.EG.7)G0 TO 370232:IF(NTRCK.EG.5)G0 TO 366233:IF(NTRCK.EG.5)G0 TO 350234:IF(NTRCK.EG.2)G0 TO 340235:IF(NTRCK.EG.2)G0 TO 320236:IF(NTRCK.EG.2)G0 TO 310238:N00=N00+1239:RRT0(N00)=RT240:G0 TO 360241:390242:RRT9(N09)=RT243:G0 TO 360244:380245:RKT8(N08)=RT246:G0 TO 360247:370246:G0 TO 360247:370246:G0 TO 360247:370246:G0 TO 360247:370246:G0 TO 360247:37025:G0 TO 360250:366250:366250:360251:RRT6(N06)=RT252:G0 TO 360253:350350N05=N05+1251:RRT5(N05)=RT255:G0 TO 360	
230:       IF(NTRCK.EQ.8)G0 T0 380         231:       IF(NTRCK.EQ.7)G0 T0 370         232:       IF(NTRCK.EQ.7)G0 T0 366         233:       IF(NTRCK.EQ.5)G0 T0 350         234:       IF(NTRCK.EQ.3)G0 T0 330         235:       IF(NTRCK.EQ.3)G0 T0 320         236:       IF(NTRCK.EQ.2)G0 T0 320         237:       IF(NTRCK.EQ.1)G0 T0 310         238:       N00=N00+1         239:       RRT0(N00)=RT         240:       G0 T0 360         241:       390         242:       RRT9(N09)=RT         243:       G0 T0 360         244:       380         245:       RRT8(N08)=RT         246:       G0 T0 360         244:       380         245:       RRT8(N08)=RT         246:       G0 T0 360         247:       370         370       N07=N07+1         248:       RRT7(N07)=ET         249:       G0 T0 360         250:       366         251:       RRT6(N06)=RT         252:       G0 T0 360         253:       350         254:       RRT5(N05)=RT         255:       G0 T0 360 <th></th>	
231: IF (NTRCK $\cdot$ EG $\cdot$ 7) GO TO 370 232: IF (NTRCK $\cdot$ EG $\cdot$ 6) GO TO 366 233: IF (NTRCK $\cdot$ EG $\cdot$ 5) GO TO 350 234: IF (NTRCK $\cdot$ EG $\cdot$ 3) GO TO 340 235: IF (NTRCK $\cdot$ EG $\cdot$ 3) GO TO 320 236: IF (NTRCK $\cdot$ EG $\cdot$ 2) GO TO 320 237: IF (NTRCK $\cdot$ EG $\cdot$ 1) GO TO 310 238: NO $0 =$ NO $0 + 1$ 239: RRT $0 (NO 0) =$ RT 240: GO TO 360 241: 390 NO $9 =$ NO $9 + 1$ 242: RRT9 (NO $9) =$ RT 243: GO TO 360 244: 380 NO $8 =$ NO $8 + 1$ 245: RRT8 (NO $8) =$ RT 246: GO TO 360 247: 370 NO $7 =$ NO $7 + 1$ 248: RRT $7 (NO 7) =$ ET 249: GO TO 360 250: 366 NO $6 =$ NO $6 + 1$ 251: RRT $6 (NO 6) =$ RT 252: GO TO 360 253: 350 NO $5 =$ NO $5 + 1$ 254: RRT $5 (NO 5) =$ RT 255: GO TO 360	
232:IF(NTRCX.EG.6)G0 T0 366233:IF(NTRCX.EQ.5)G0 T0 350234:IF(NTRCX.EQ.4)G0 T0 340235:IF(NTRCX.EQ.3)G0 T0 330236:IF(NTRCX.EQ.2)G0 T0 320237:IF(NTRCX.EC.1)G0 T0 310238:NO $\theta$ =NO $\theta$ +1239:RRT $\theta$ (NO $\theta$ )=RT240:G0 T0 360241:39 $\theta$ NO9=NO9+1242:RRT9 (NO9)=RT243:G0 T0 360244:38 $\theta$ NO8=NO8+1245:RFT8 (NO8)=RT246:G0 T0 360247:37 $\theta$ NO7=NO7+1248:RFT7 (NO7)=FT249:G0 T0 36 $\theta$ 250:366250:366250:35 $\theta$ NO5=NO5+1251:RRT5 (NO5)=RT255:G0 T0 36 $\theta$	
233: IF (NTRCK. EQ. 5) GO TO 35Ø 234: IF (NTRCK. EQ. 4) GO TO 34Ø 235: IF (NTRCK. EQ. 3) GO TO 33Ø 236: IF (NTRCK. EQ. 2) GO TO 32Ø 237: IF (NTRCK. EQ. 1) GO TO 31Ø 238: NO $@$ =NO $@$ +1 239: RRT $@$ (NO $Ø$ )=RT 24 $@$ : GO TO 36Ø 241: 39 $@$ NO9=NO9+1 242: RRT9(NO9)=RT 243: GO TO 36Ø 244: 38 $Ø$ NO $B$ =NO $B$ +1 245: RRT $B$ (NO $B$ )=RT 246: GO TO 36Ø 247: 37 $Ø$ NO $T$ =NO $T$ +1 248: RRT $T$ (NO $T$ )=RT 249: GO TO 36 $Ø$ 247: 37 $Ø$ NO $T$ =NO $T$ +1 248: RRT $T$ (NO $T$ )=RT 249: GO TO 36 $@$ 250: 366 NO $6$ =NO $6$ +1 251: RRT $6$ (NO $6$ )=RT 252: GO TO 36 $Ø$ 253: 35 $Ø$ NO $5$ =NO $5$ +1 254: RRT $5$ (NO $5$ )=RT 255: GO TO 36 $@$	
234:IF(NTECK.EC.4) G0TO $340$ 235:IF(NTECK.EC.3) G0TO $330$ 236:IF(NTECK.EC.2) G0TO $320$ 237:IF(NTECK.EC.1) G0TO $310$ 238:NO0=NO0+1239:RET $0(NO0) = ET$ 240:G0TO241:390NO9=NO9+1242:RET9(NO9) = ET243:G0TO244:380NO8=NO8+1245:RET8(NO8) = ET246:G0TO247:370NO7=NO7+1248:RET7(NO7) = ET249:GOTO250:366NO6=NO6+1251:RET6(NO6) = ET252:GOTO253:350NO5=NO5+1254:RET5(NO5) = ET255:GOTO360TO	
235:IF(NTRCK.EQ.3) GO TO 330236:IF(NTRCK.EQ.2) GO TO 320237:IF(NTRCK.EC.1) GO TO 310238: $N00=N00+1$ 239: $RTC(N00)=RT$ 240:GO TO 360241:390242: $RT79(N09)=RT$ 243:GO TO 360244:380245: $RFT8(N08)=RT$ 246:GO TO 360247:370247:370247:S70247:S70247:S70251: $RRT7(N07)=ET$ 249:GO TO 360251: $RRT6(N06)=RT$ 252:GO TO 360253:350254: $RRT5(N05)=RT$ 255:GO TO 360	
236:       IF(NTRCK.EG.2)G0 TO 320         237:       IF(NTRCK.EG.1)G0 TO 310         238:       NO@=NO@+1         239:       RTT@(NO@)=RT         240:       GO TO 360         241:       39 Ø         242:       RTT9(NO9)=RT         243:       GO TO 360         244:       38 Ø         244:       38 Ø         245:       RTT9(NO9)=RT         243:       GO TO 360         244:       38 Ø         245:       RTT8(NO8)=RT         246:       GO TO 360         247:       37 Ø         NO7=NO7+1         248:       RTT7(NO7)=ET         249:       GO TO 360         250:       366         NO6=NO6+1         251:       RT6(NO6)=RT         252:       GO TO 360         253:       350         NO5=NO5+1         254:       RT5(NO5)=RT         255:       GO TO 360	
237:IF(NTRCK.EC.1) GO TO $310$ $238:$ N0@=N0@+1 $239:$ RRT@(N0@)=RT $240:$ GO TO $360$ $241:$ $39@$ $242:$ RRT9(N09)=RT $243:$ GO TO $360$ $244:$ $380$ $244:$ $380$ $N08=N08+1$ $245:$ RRT8(N08)=RT $246:$ GO TO $360$ $247:$ $370$ $N07=N07+1$ $248:$ RRT7(N07)=ET $249:$ GO TO $360$ $250:$ $366$ $250:$ $366$ $250:$ $360$ $251:$ RRT6(N06)=RT $252:$ GO TO $360$ $253:$ $350$ $N05=N05+1$ $254:$ RRT5(N05)=RT $255:$ GO TO $360$	
238: $N0@=N0@+1$ $239:$ $RTT@(N0@)=RT$ $240:$ $GO TO 36@$ $241:$ $39@ N09=N09+1$ $242:$ $RT9(N09)=RT$ $243:$ $GO TO 36@$ $244:$ $38@ N08=N08+1$ $245:$ $RT8(N08)=RT$ $246:$ $GO TO 36@$ $247:$ $37@ N07=N07+1$ $248:$ $RFT7(N07)=ET$ $249:$ $GO TO 36@$ $250:$ $366 N06=N06+1$ $251:$ $RRT6(N06)=RT$ $252:$ $GO TO 36@$ $253:$ $35@ N05=N05+1$ $254:$ $RRT5(N05)=RT$ $255:$ $GO TO 36@$	
239: RFT @(NO Ø) = RT 240: GO TO 360 241: 390 NO9=NO9+1 242: RTT9(NO9) = RT 243: GO TO 360 244: 380 NO8=NO8+1 245: RFT8(NO8) = RT 246: GO TO 360 247: 370 NO7=NO7+1 248: RFT7(NO7) = ET 249: GO TO 360 250: 366 NO6=NO6+1 251: RFT6(NO6) = RT 252: GO TO 360 253: 350 NO5=NO5+1 254: RFT5(NO5) = RT 255: GO TO 360	
240:       GO TO 360         241:       390       N09=N09+1         242:       RTT9(N09)=RT         243:       GO TO 360         244:       380       N08=N08+1         245:       RFT8(N08)=RT         246:       GO TO 360         247:       370       N07=N07+1         248:       RFT7(N07)=ET         249:       GO TO 360         250:       366       N06=N06+1         251:       RRT6(N06)=RT         252:       GO TO 360         253:       350       N05=N05+1         254:       RRT5(N05)=RT         255:       GO TO 360	
241: 39 Ø N09=N09+1 242: RTT9(N09)=RT 243: GO TO 36Ø 244: 38 Ø N08=N08+1 245: RFT8(N08)=RT 246: GO TO 36Ø 247: 37 Ø N07=N07+1 248: RFT7(N07)=ET 249: GO TO 36Ø 250: 366 N06=N06+1 251: RFT6(N06)=RT 252: GO TO 36Ø 253: 35Ø N05=N05+1 254: RFT5(N05)=RT 255: GO TO 36Ø	
242:       RTT9(N09)=RT         243:       GO TO 360         244:       380       N08=N08+1         245:       RFT8(N08)=RT         246:       GO TO 360         247:       370       N07=N07+1         248:       RFT7(N07)=ET         249:       GO TO 360         250:       366       N06=N06+1         251:       RRT6(N06)=RT         252:       GO TO 360         253:       350       N05=N05+1         254:       RRT5(N05)=RT         255:       GO TO 360	
243:       GO TO 360         244:       380       NO8=NO8+1         245:       RFT8(NO8)=RT         246:       GO TO 360         247:       370       NO7=NO7+1         248:       RFT7(NO7)=ET         249:       GO TO 360         250:       366       NO6=NO6+1         251:       RRT6(NO6)=RT         252:       GO TO 360         253:       350       NO5=NO5+1         254:       RRT5(NO5)=RT         255:       GO TO 360	
244: 380       N08=N08+1         245:       RFT8(N08)=RT         246:       GO TO 360         247: 370       N07=N07+1         248:       RFT7(N07)=ET         249:       GO TO 360         250: 366       N06=N06+1         251:       RFT6(N06)=RT         252:       GO TO 360         253: 350       N05=N05+1         254:       RFT5(N05)=RT         255:       GO TO 360	
245:       RFT8(N08)=RT         246:       GO TO 360         247:       370       N07=N07+1         248:       RFT7(N07)=FT         249:       GO TO 360         250:       366       N06=N06+1         251:       RFT6(N06)=RT         252:       GO TO 360         253:       350       N05=N05+1         254:       RFT5(N05)=RT         255:       GO TO 360	
246:       GO TO 36Ø         247:       37Ø       N07=N07+1         248:       RET7(N07)=ET         249:       GO TO 36Ø         250:       366       N06=N06+1         251:       RET6(N06)=ET         252:       GO TO 36Ø         253:       35Ø       N05=N05+1         254:       RET5(N05)=ET         255:       GO TO 36Ø	
247: 370       N07=N07+1         248:       RET7(N07)=ET         249:       G0 T0 360         250: 366       N06=N06+1         251:       RET6(N06)=ET         252:       G0 T0 360         253: 350       N05=N05+1         254:       RET5(N05)=ET         255:       G0 T0 360	
248:       RRT7(N07)=ET         249:       GO TO 360         250: 366       N06=N06+1         251:       RRT6(N06)=RT         252:       GO TO 360         253: 350       N05=N05+1         254:       RRT5(N05)=RT         255:       GO TO 360	
249:       GO TO 360         250:       366       N06=N06+1         251:       FRT6(N06)=RT         252:       GO TO 360         253:       350       N05=N05+1         254:       FRT5(N05)=RT         255:       GO TO 360	
251:       RRT6(N06)=RT         252:       GO TO 360         253:       350 N05=N05+1         254:       RRT5(N05)=RT         255:       GO TO 360	
252:       GO TO 360         253:       350       NO5=NO5+1         254:       RRT5(NO5)=RT         255:       GO TO 360	
253: 350 N05=N05+1 254: RRT5(N05)=RT 255: GO TO 360	
254: RRT5(N05)=RT 255: GO TO 360	
255: GO TO 360	
256: 340 N04=N04+1	
257: RRT4(N04)=RT	
258: GO TO 360	
259: 330 NO3=NO3+1	
260: RET3(NO3)=RT	
261: GO TO 360	
262: 320 N02=N02+1	
263: RRT2(NO2)=RT 264: GO TO 360	
265: 31Ø NO1=NO1+1	

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	266:		EETI(NOI) = ET
	267:	360	CONTINUE
	268:	300	CONTINUE
	269:		DO $400$ I I= 1, 10
	270:		WEITE(6,4000)EET0(11), RET1(11), RET2(11), EET3(11),
	271:		<pre>* RET4(I1), RET5(I1), RET6(I1), RET7(I1),</pre>
	272:		* RET8(11), RET9(11)
	273:	4000	FORMAT(5X,F6.2,5(6X,F6.2)/2X,4(6X,F6.2))
	274:	466	CONTINUE
	275:		WRITE(6, 4001)
	276:	4001	F0EMAT(//////)
	277:	101	CONTINUE
Ċ	278:	100	CONTINUE
	279:	102	CONTINUE
	280:		WEITE(6,4400)
	281:	4400	FOFMAT(1H1///////////////////////////////////
	282:		RETURN
	283:		EN D

## APPENDIX C

The program for experiment III.

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	SRTEXP	1			•						
	1:	С ;	*****	******	*******	******	*****	*******	***	***	
	2:	C ,	*			1997 - 19				*	
	3:	-	*		MAIN PR					*	
	4:	. –	*		T					*	
	5: 6:		*	<b>TUT</b>		TROL	<b>TTM</b>			*	
	7:		* •	INC	SIMPLE R EXPER		TIME			*	
	. 8:	-	*							*	
	9:		**********	*******	*******	******	*****	*******	***	***	
	10:	С									
	11:	С				· · · · ·		•			
	12:	С		IN	STRUM EN T	LAYOUT					
	13:	. C		• •	•						
	14:	-		0UT4Ø		INP4Ø		INP41	•		
	15:	C.	<b></b>							•	
	16:	C	BIT7	LED		START		RESPONSE			÷
	- • ·	C	ı						•		•
	18: 19:	U	DIMENSION	A1(15),	NO(15) - A	2(15). 0/	0(15)				
	20:	С	DINENSION	AI(1573)	42(1)/) A	J(15/) H2	4(15)				
	21:		CALL OUT40	(Ø)				• .			
	22:		CALL OUT41								
	23:		WRITE( 2, 10	00)							
	24:	1000	FORMAT('SU	BJECT NAM	1E ?')						
	25:		READ(1,110	Ø) A 1		-					
	26:	1100	FORMAT(15A	-		•					
	27:		WRITE(2, 12)								•
	28:	1200	FORMAT( CON		l i i i i i i i i i i i i i i i i i i i						
	29:		READ( 1, 110)								
	3Ø: 31:	1300	WRITE(2,13) FORMAT('ST		2 1 )	•					
	32:	1300	READ(1, 110)		2 1						
	33:		CALL BLK 1	07 A 3							
	34:		CALL BLK2								
	3.5:		CALL BLK3								÷
	36:		CALL BLK4								
	37:		CALL BLK5								
	. 38 :		CALL BLK6					· ·			
	39:		CALL BLK7								
	40:		WRITE(2,140								
	41:	1400	FORMAT('ENI		>						
	42: 43:		READ(1,1100 WRITE(6,200								
	43:	2000	FORMAT(1H1)								
	45:	2000	CALL DTANL		IUNJ I SHE						
	46:		CALL DTANL 2				1990 - B. A.				
ċ	47:		CALL DTANLS								
	48 :		CALL DTANL								
	49:		CALL DTANLS								
	50:		CALL DTANLE								
	51:		CALL DTANL 7					•			
	52:		WRITE(6,300								
	· 53:	3000	FORMAT( 1H 1,	10(/))		•					

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				•	
SRTEXP	1				
54:	STOP	· · · · ·			
55:	EN D				
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م سرم ہے 'و سے ہو جب ہے ہے۔ ا			······································		
	· · ·				•
		1. A.			
SRTEXP	2				
	-	· ·		•	
1:	SUBROUTINE	BLK 1			
2: 3:		I STM ( 100) , XRT ( / 3, 0, 0, 1, 0, 0, 0, 0		4. 2. 4. 1. 0	. /. 1. 3.
4:	*	Ø 3 3 3 0 2 1 2			
5:	*	1, 3, 2, 0, 1, 2, 4	o Øo 4o 4o 3o 4o	3, 2, 4, 4, 2.	, 4, 4, Q,
6:	*	1,4,3,2,0,1,1			
7: 8:	* WRITE(2,10	<b>1 ، 1 ، 1 ، 4 ، 2 ، 2 ، 4</b> (۵۵)	s 2s 2s 2s 2s 6s 2s	2 60 60 61 62	. 17 و1 وي و
			?')	· .	
10:	CALL BLKØ(1				
11:	CALL FL1	н на Н		•	
12: 13:	REWIND 8 WRITE(8)IS	TM.YET			
13:	RETURN				
15:	END		·		
		•			
				<u>،</u>	
م الله المراجع المراجع المسلح المراجع ا					مرجعة مستحدة المرتبط محمول عنداج فعلا الأرام ال ا
м			· .		
•	• •	•			
				2 A	• .
	· ·	•			
SRT EX P	3				÷
1:	SUBROUTINE	BLK 2		•	
2:		STM(100), XRT(		· .	
3:		'Ø= 1= 1= Ø= 2= Ø= 4.			
4: 5:	*	2, 1, 2, 2, 3, 3, 3. Ø, 4, 2, 1, 4, 4, 1.			
6:	*	2, 1, 1, 1, 0, 2, 4.			
7:	*	4, 1, 3, 4, 2, 3, 3.	1 - 4 - 2 - 0 - 2 -	0, 4, 4, 0, 3,	4, 0, 01
8:	WRITE(2,100				
9: 10:	1000 FORMAT( BLC CALL BLK0(I		t ()		
11:	CALL FL2				
12:	REWIND 8		<b>1</b>		· -
13:	WRITE(8)IST	MAXRT			
14:	R E T U RN EN D				
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							•				•			
	SRTE	EXP	4			•					÷			
		1:		SUBROUTINI	E ELK3									
		2:		DIMENSION		0), XRT	(100)							
		3:		DATA ISTM	/ 1, 4, 1,									
		4:		*		2,2,4,								
		5:		*		1, 4, 2, 3, 0, 2,								
		6: 7:			رد دع دد د2 د1 د3 ب									
		8:		WRITE(2, 10			27 07 4	0.00						
		9:	1000	FORMAT( 'BL		• READY	?')							
	1	10:		CALL BLKØC	I STM, XR	T)	•	~	· ·				•	
	-	11:		CALL FL3										
•	-	12:		REWIND 8 WRITE(8)IS										T.
		13:		RETURN	MIARI									
		15:		END			÷							
							•							
	·			-										
	<b>ب</b>			·			······						•	
				· · · ·										
	SRTE	ΞXΡ	5											
		1:		SUBROUTINE	BLK4									
		2:		DIMENSION		0).XPT	(100)							
	•	3:			10,0,0,			4 م ا	1 e0 c	. 4. 4.	• 4 • Ø	1 1 1	, 2,	
		4:		*		1, 3, 2,								
		5:		*	3, 1, 2,	4, 3, 2,	2,3,4	, Ø, I	, 3, Ø	• 3• 4.	, 2, 2	, 2, 3.	· 1 ·	
		6:		*		3, 2, 0,				-		-		
		7:		*		1, 3, 4,	4, 1, 2	s 4s 1	s ] s ].	• 3• Ø.	2,3	e 2e 3.	• Ø/	
		8: 9:	1000	WRITE(2,10 FORMAT('BL		- DEADY	211					•		
	1	Ø:		CALL BLKØ			: )							
		1:		CALL FL4										
		2:	1	REWIND 8										
	1	3:		WRITE(8)IS	TM. YDT									
					IDDVUI									
	1	4:		RETURN										
	1													

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			•
	SRTEXP	6	
•	1: 2: 3: 4: 5: 6: 7: 8: 9: 10: 11: 12: 13: 13: 14: 15:	SUBROUTINE ELK5 DIMENSION ISTM(100), XRT(100) DATA ISTM/3, 4, 1, 0, 3, 1, 0, 0, 2, 2, 0, 1, 4, 2, 0 * 3, 4, 1, 0, 3, 2, 3, 3, 0, 0, 1, 3, 4, 2, 1 * 4, 3, 0, 3, 3, 4, 0, 4, 1, 3, 3, 2, 3, 2, 2, 2, 1, 1, 2, 1, 2, 3, 2, 4, 3, 3, 3, 1, 1, 2, 1, 2, 3, 2, 4, 3, 3, 3, 1, 1, 2, 1, 2, 3, 2, 4, 3, 3, 3, 1, 1, 2, 1, 1, 2, 3, 2, 4, 3, 3, 3, 1, 1, 2, 3, 2, 4, 3, 3, 3, 1, 1, 2, 3, 4, 4, 4, 3, 4, 0, 3, 0, 0, 1, 4, 1, 1, 2, 3, 2, 4, 4, 4, 3, 4, 0, 3, 0, 0, 1, 4, 1, 1, 2, 3, 2, 4, 4, 4, 3, 4, 0, 3, 0, 0, 1, 4, 1, 1, 2, 3, 2, 4, 4, 4, 3, 4, 0, 3, 0, 0, 1, 4, 1, 1, 2, 3, 2, 4, 4, 4, 3, 4, 0, 3, 0, 0, 1, 4, 1, 1, 2, 3, 2, 4, 4, 4, 3, 4, 0, 3, 0, 0, 1, 4, 1, 1, 2, 3, 3, 4, 4, 4, 3, 4, 0, 3, 0, 0, 1, 4, 1, 1, 2, 3, 3, 4, 4, 4, 3, 4, 0, 3, 0, 0, 1, 4, 1, 1, 2, 3, 3, 4, 4, 4, 3, 4, 0, 3, 0, 0, 1, 4, 1, 1, 2, 3, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4,	د2 د2 د0 دا دا دا د0 د2 د0 د2 د2 د
	10.		
		the second se	
•		and the second	
			,
	SRTEXP	7	
	1:	SUBROUTINE BLK6	
•	2:	DIMENSION ISTM(100), XRT(100)	
-	3:	DATA ISTM/4, 1, 3, 4, 1, 1, 4, 4, 1, 2, 2, 0, 2, 1, 2	a la 62 42 42 62
	4:	* 1,4,0,4,1,2,3,2,1,0,2,2,1,0,1,0	
	5:	* 4, 1, 0, 4, 0, 3, 2, 1, 3, 1, 3, 0, 0, 4	
	6:	* Ø, 3, 1, 2, 3, 0, 3, 4, 2, 2, 1, 4, 2, 4	, 3, 4, 3, 3, 1,
1	7:	* 0,0,3,2,0,0,2,0,1,2,3,1,3,4,0	
	8:	WRITE(2,1000)	
1	9:	1000 FORMAT( 'BLOCK 6 READY ? ')	•
	1Ø:	CALL BLKØ(ISTM,XRT)	
	11:	CALL FL6	a.
1	12:	REWIND 8	
1	13:	WRITE(8) I STM, XRT	
	14:	RETURN	• ,
	15:	EN D	·· .
	· · · , · · · · · · · · ·		

SRTEXP g SUBROUTINE BLK7 1: DIMENSION ISTM(100), XRT(100) 2: 3: DATA ISTM/0, 2, 0, 1, 1, 4, 4, 3, 3, 0, 2, 0, 1, 4, 2, 0, 1, 0, 3, 2, 3, 3, 3, 3, 3, 2, 4, 3, 4, 0, 2, 1, 2, 4, 1, 0, 1, 3, 0, 2, 4: Ø= 1= 1= 1= 2= 3= 4= 1= 4= 3= 2= 1= 2= 1= Ø= 4= 3= 2= 4= 1= 5: 6: \* 2, 0, 0, 3, 3, 1, 3, 1, 0, 1, 4, 0, 0, 1, 2, 4, 3, 0, 4, 4, 7: 2, 4, 1, 3, 2, 3, 2, 2, 1, 4, 0, 4, 0, 4, 2, 2, 4, 3, 0, 4/ \* 8: . WRI TE(2, 1000) FORMAT( 'BLOCK 7 ... READY ?') 9: 1000 10: CALL BLKØ(ISTM, XRT) 11: CALL FL7 12: REWIND 8 13: WRITE(8) ISTM, XRT 14: RETURN 15: END

- 134 -

SRT EX P	9	
1:	_	SUBROUTINE ELK@(ISTM, XRT)
2:	U	
3:	_	DIMENSION ISTM(100), XRT(100)
4:	С	
5:		READ( 1, 1001) A
-	1001	FORMAT(A4)
7:		CALL INP40(IRES)
8:		IF(IRES.EQ.0)GO TO 100
9:		CALL INTLIM
10:	101	CALL TMR(I10MS, ISEC)
11:		IF(110MS.LT.50).GO TO 101
12:		CALL OUT40(128)
13:	102	CALL INP41(IRES)
0 14:		IF(IRES.EQ.0)GO TO 102
15:		CALL OUT40(Ø)
16:		DO 110 I1=1.2
17:		CALL INTLIM
18:	111	CALL TMR(I10MS; ISEC)
19:		IF(ISEC.LT.2)G0 TO 111
20:		CALL OUT40(128)
	112	CALL INP41(IRES)
22:		IF(IRES-EQ-0)G0 TO 112
23:		CALL OUT40(0)
	110	CONTINUE
25:		DO 200 I2=1,100
26:		CALL INTLIM
27:		I21=ISTM(I2)
28:		I T I = 100
	201	IF(I21.EQ.Ø)GO TO 211
30:		ITI=IFIX(FLOAT(ITI)*1.3)
31:		121=121-1
32:		GO TO 201
	211	CALL TMR(I 10MS, I SEC)
34:		IF(I10MS.LT.ITI)GO TO 211
35:		CALL OUT40(128)
36:		CALL INTLIM
	212	CALL INP41(IRES)
38:		CALL TMR(I 10MS, I SEC)
39:		IF(IRES.EQ.0)GO TO 212
40:		CALL OUT40(0)
41:		XRT(12)=FLOAT(1104S)/100.0
	200 .	CONTINUE
43:	200	CALL OWARI
44:	•	RETURN
45:		END
490		

	1			
			- 136 -	
			- 130 -	
	SRTEXF	> 1Ø		
	1:		SUBROUTINE DTANL 1	
	2:	C .		
	3:		DIMENSION ISTM(100), XRT(100)	
		C		
-	5:		CALL FL1	
	6: .7:		REWIND 8 READ(8)ISTM, XRT	
	8:		WRITE(6, 1000)	
	9:		FORMAT(1H1, 10X, 'DATA OF BLOCK 1'///	
	10:	-	* 1X, 5('ITI RT(SEC) '),//)	
	11:		CALL DTANLØ(ISTM,XRT)	
	12:		RETURN	
	13:	,	EN D	
				in the second
	••••••••••••••••••••••••••••••••••••••			
•				
	SRTEXP	11		•
	SHILAF			
	1:		SUBROUTINE DTANL 2	
	2:			
•	3:		DIMENSION ISTM(100), XRT(100)	
	4:	C		
	5:		CALL FL2	
	6:		REWIND 8	
	7:		READ(8) I STM, XRT	
	8:	1000	WRITE(6, $1000$ )	
			FORMAT(1H1, 10X, 'DATA OF BLOCK 2'/// 1X, 5('ITI RT(SEC) '),//)	
	10: 11:		CALL DTANLØ(ISTM, XRT)	
	12:		RETURN	
	13:		END	
	•			
			· · · · · · · · · · · · · · · · · · ·	
1				
				•
	SRTEXP	12		
}				
	1:		SUBROUTINE DTANL3	
-		<b>C</b>		
ĺ	3:	_	DIMENSION ISTM(100), XRT(100)	
	4:	C .		
1	5:		CALL FL3	
1 	6: 7:		REWIND 8 READ(8)ISTM, XRT	
	8:	•	WRITE(6, 1000)	
	9:	1000	FORMAT(1H1, 10X, 'DATA OF BLOCK 3'///	
	10:		1X, 5('ITI RT(SEC) '),//)	
•	11:		CALL DTANLØ(ISTM, XRT)	
	12:		RETURN	
	13:		END	

2 .

SRTEXP	13	
1:		SUBROUTINE DTANL 4
2: 3:	С	DIMENSION ISTM(100), XRT(100)
4:	С	CALL FL4
5: 6:		REWIND 8
7: 8:		READ(8)ISTM, XRT WRITE(6, 1000)
9: 10:	1000	FORMAT(1H1, 10X, 'DATA OF BLOCK 4'/// * 1X, 5('ITI RT(SEC) '),//)
10:		CALL DTANLØ(ISTM, XRT)
12: 13:		R ET URN EN D

-----

SRTEXP 14 SUBROUTINE DTANL 5 1: 2: C DIMENSION ISTM(100), XRT(100) 3: 4: C CALL FL5 5: REWIND 8 6: . READ(8) I STM, XRT 7: WRITE(6, 1000) 8: 9: 1000 FORMAT(1H1, 10X, 'DATA OF BLOCK 5'/// \* 1X, 5('ITI RT(SEC) '),//) 10: CALL DTANLØ(ISTM, XRT) 11: RETURN 12: 13: END

SRTEXP 15 SUBROUTINE DTANL6 1: 2: C · DIMENSION ISTM(100), XRT(100) 3: 4: C CALL FL6 5: REWIND 8 6: . READ(8) I STM, XRT 7: WRITE(6, 1000) 8: 9: 1000 FORMAT( 1H1, 10X, 'DATA OF BLOCK 6'/// \* IX, 5('ITI RT(SEC) '),//) 10: CALL DTANLØ(ISTM, XRT) 11: 12: RETURN 13: EN D

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SRTEXP	16
--------	----

1:

SUBBO	UTINE	DTANL 7
20010		

2:	C
3:	DIMENSION ISTM(100),XRT(100)
4:	<b>C</b>
5:	CALL FL7
6:	REWIND 8
7:	READ(8) I STM, XRT
8:	WRITE(6, 1000)
9:	1000 FORMATCIHI, 10X, DATA OF BLOCK 7'//
10:	* 1X, 5('ITI RT(SEC) '),//)
11:	CALL DTANLØ(ISTM,XRT)
12:	RETURN
13:	EN D

SRT EX P	17	
1:	с	SUBROUTINE DTANLØ(ISTM, XRT)
3: 4:	·	DIMENSION I STM(100),XRT(100),XITI(5),XTEL(5,5,10), * JTEL(5,5),XSTM(5),XXRT(5)
5: 6:	C .	D0 100 I 1= 1, 20
7:		D0 110 I11=1.5
. 8:		J l=(I l-1)*5+I l l XXRT(I l l)=XRT(J l)
9: 10:		KSTM = 100
11:		KSTP=ISTM(J1)
12:	112	$IF(KSTP \cdot EQ \cdot Q) GQ TQ 111$
13:		KSTM=IFIX(FLOAT(KSTM) * 1.3)
14:		KSTP=KSTP-1
15:		GO TO 112
16:	111	XSTM(111)=FLOAT(KSTM)/100.0
17:	110	CONTINUE
18:		WRITE(6, 1100)(XSTM(J1),XXRT(J1),J1=1,5)
19:	1100	
20:	100	CONTINUE
21:		
22:	C	
23: 24:		DO 200 I2=1,5 DO 201 I21=1,5
24.		D0 $202$ I $22=1,10$
26:		XTEL(12,121,122)=99999.9
27:	202	CONTINUE
28:		JTBL(12, 121) = 0
29:	201	CONTINUE
° 3Ø∶	200	CONTINUE
31:		K 2= I STM(1) + 1
32:		DO 210 I2=2,100
33:		K 1=K2
34:		K2=I STM(I2) + 1
35:		JTBL(K1, K2) = JTBL(K1, K2) + 1
36: 37:		K3=JTBL(K1,K2) XTBL(K1,K2,K3)=XRT(I2)
	210	CONTINUE
39:	210	KITI=100
40:		DO 300 I 3= 1, 5
41:		XITI(I3)=FLOAT(KITI)/100.0
42:		KITI=IFIX(FLOAT(KITI)*1.3)
43:	300	CONTINUE
44:		VRI TE( 6, 2000)
45:	2000	
46:		DO 400 I 4= 1, 5
47:	0.00	WRITE(6, 2100)XITI(14), (XITI(J4), J4=1, 5)
48:	2100	FORMAT(///15X,'RT''S FOR', F5.2, 1X, 'SEC. FP'// * 12X, 'CONTINGENT ON PREVIUOS FP''S.'//
49: 50:		* 10X, 5(F5.2, 'SEC.')//)
51:		WRI TE(6, 2200) ((XTBL(JK1, I4, JK2), JK1=1, 5), JK2=1, 10)
52:	2200	FORMAT(10(10X, 5(F5.2, 5X),/))
	400	CONTINUE

SRTEXP 17

54:	-	
55:	С	
56:		RETURN
57:		EN D

## APPENDIX D

The programs for experiment IV.

The program for the continuous(in session 1)-

then-discrete(in session 2) condition.

ŝ

SRT.C.D 1 \*\*\*\*\*\*\*\*\*\* 1: C . . 2: C . \* MAIN PROGRAMM 3: C × 4: C TO \* CONTROL 5: C \* THE SIMPLE REACTION TIME 6: C \* 7: C \* EXPERIMENT 8: C (CONTINUOUS-DISCRETE CONTEXT) 9: C \* 10: C 11: C 12: C INSTRUMENT LAYOUT 13: C 14: C OUT40 OUT41 INP40 15: C INP41 16: C 17: C BIT7 LED BUZZ ER START RESPONSE 18: C 19: C 20: DIMENSION A1(15), A3(15), A4(15) 21: C CALL OUT40(0) 22: CALL OUT41(Ø) 23: 24: WEITE(2, 1200) 25: 1200 FOFMAT(//'CONTINUOUS-DISCRETE CONTEXT CONDITION.'//) 26: WRITE(2,1000) 27: 1000 FORMAT('SUBJECT NAME ?') READ( 1, 1100) A1 28: 29: 1100 FORMAT(15A4) WEITE(2, 1300) 30: 31: 1300 FOFMAT('START TIME ?') 32: READ(1, 1100) A3 33: CALL BLKIC CALL BLK2C 34: 35: CALL BLK3C 36: CALL BLK4C 37: CALL BLK 5C WEITE(2,4000) 38: 39: 4000 FORMAT(///'CONTEXT WILL CHANGE.'/ \* 'ATTENTION PLEASE !'//) 40: CALL BLK6D 41: CALL BLK7D 42: CALL ELK8D 43: CALL BLK9 D 44: 45: CALL BLKAD 46: WRITE(2, 1400) 47: 1400 FORMAT('END TIME ?') 48 READ( 1, 1100) A4 49: WRITE(6,2000)A1,A3,A4 50: 2000 FORMAT( 1H 1, 10(/), 10X, 51: \* '\*\*\*\* CONTINUOUS-DISCRETE CONTEXT ///,3(10X,15A4//)) 52: \* 53: CALL DTANL 1

54:		CALL	DTANL 2
. 55:		CALL	DTANL 3
56:		CALL	DTANL 4
57:		CALL	DTANL 5
58:		CALL	DTANL6
59:		CALL	DTANL 7
60:		CALL	DTANL8
61:		CALL	DTANL9
62:		CALL	DTANLA
63:		WRI T	E(6,3000) -
64:	3000	FOFM	AT(1H1,10(/))
65:		STOP	
66:		EN D	

	_	•		
	SRT.C.D	2		
,				
	1:		SUBROUTINE BLKIC	
	2:		DIMENSION ISTM(100), XRT(100)	3.
				<i>a</i>
-4	3:			-
	4:		* (1, 3, 2, 0, 1, 2, 4, 0, 4, 3, 4, 3, 2, 4, 4, 2, 4, 4, 2, 4, 4, 2, 4, 4, 2, 4, 4, 2, 4, 4, 2, 4, 4, 2, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4,	Ø,
	5:		* 1, 3, 2, 0, 1, 2, 4, 0, 4, 0, 1, 1, 0, 0, 3, 3, 3,	4,
	· 6:		* 1, 4, 3, 2, 0, 1, 1, 1, 4, 0, 1, 3, 1, 1, 0, 0, 3, 3, 3, * 1, 4, 3, 2, 0, 1, 1, 1, 4, 0, 1, 3, 1, 1, 0, 0, 2, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3,	1/
-			* 1, 1, 1, 2, 2, 4, 2, 2, 2, 0, 2, 2, 1, 0, 0, 2, 3, 1, *	17
	7:		WEITE(2, 1000)	
	8:		FORMAT('BLOCK IREADY ?')	
	9:	1000	FORMATC BLUCK I READLE	
	10:		CALL BLKØC(ISTM, XRT)	
			CALL FL1	
	11:		REWIND 8	
	12:		REWIND G	
	13:		WRITE(8)ISTM, XRT	
	14:		RETURN	
	15:		EN D	
	15:			
<u>_</u>				
			en e	
	ی ایرون میں میں میں میں میں م			
			······································	
,	ی در این در می می اور		······································	
• •				
	···· ··· ··· ··· ··· ··· ···			
	SRT.C.I	) 3		
	SRT.C.I	5 3		
		5 3		
	1:	D 3	SUBROUTINE BLK2C	
		5 3	SUBROUTINE BLK2C DIMENSION ISTM(100),XRT(100)	
	1:	5 3	SUBROUTINE BLK2C	. 3,
	1: 2: 3:	) 3	SUBROUTINE BLK2C DIMENSION ISTM(100),XRT(100) DATA ISTM/0,1,1,0,2,0,4,4,1,3,3,1,0,1,1,3,0,1,2,	
	1: 2: 3: 4:	5 3	SUBROUTINE       BLK2C         DIMENSION       ISTM(100),XRT(100)         DATA       ISTM/0,1,1,0,2,0,4,4,1,3,3,1,0,1,1,3,0,1,2,         *       2,1,2,2,3,3,3,0,2,1,4,0,4,2,2,1,4,3,2,	Ø.
	1: 2: 3: 4: 5:	23	SUBROUTINE       BLK2C         DIMENSION       ISTM(100), XRT(100)         DATA       ISTM/0, 1, 1, 0, 2, 0, 4, 4, 1, 3, 3, 1, 0, 1, 1, 3, 0, 1, 2,         *       2, 1, 2, 2, 3, 3, 3, 0, 2, 1, 4, 0, 4, 2, 2, 1, 4, 3, 2,         *       0, 4, 2, 1, 4, 4, 1, 3, 2, 0, 2, 1, 0, 3, 0, 4, 4, 2, 4,	Ø. 3.
-	1: 2: 3: 4: 5: 6:	) 3	SUBROUTINE       BLK2C         DIMENSION       ISTM(100), XRT(100)         DATA       ISTM/0, 1, 1, 0, 2, 0, 4, 4, 1, 3, 3, 1, 0, 1, 1, 3, 0, 1, 2,         *       2, 1, 2, 2, 3, 3, 3, 0, 2, 1, 4, 0, 4, 2, 2, 1, 4, 3, 2,         *       0, 4, 2, 1, 4, 4, 1, 3, 2, 0, 2, 1, 0, 3, 0, 4, 4, 2, 4,         *       2, 1, 2, 1, 4, 4, 1, 3, 2, 0, 2, 1, 0, 3, 0, 4, 4, 2, 4,         *       2, 1, 1, 1, 0, 2, 4, 4, 3, 3, 1, 3, 3, 0, 0, 2, 1, 3, 4,	Ø, 3, 2,
-	1: 2: 3: 4: 5:	) 3	SUBROUTINE       BLK2C         DIMENSION       ISTM(100), XRT(100)         DATA       ISTM/0, 1, 1, 0, 2, 0, 4, 4, 1, 3, 3, 1, 0, 1, 1, 3, 0, 1, 2,         *       2, 1, 2, 2, 3, 3, 3, 0, 2, 1, 4, 0, 4, 2, 2, 1, 4, 3, 2,         *       0, 4, 2, 1, 4, 4, 1, 3, 2, 0, 2, 1, 0, 3, 0, 4, 4, 2, 4,	Ø, 3, 2,
-	1: 2: 3: 4: 5: 6:	) 3	SUBROUTINE       BLK2C         DIMENSION       ISTM(100), XRT(100)         DATA       ISTM/0, 1, 1, 0, 2, 0, 4, 4, 1, 3, 3, 1, 0, 1, 1, 3, 0, 1, 2,         *       2, 1, 2, 2, 3, 3, 3, 0, 2, 1, 4, 0, 4, 2, 2, 1, 4, 3, 2,         *       0, 4, 2, 1, 4, 4, 1, 3, 2, 0, 2, 1, 0, 3, 0, 4, 4, 2, 4,         *       2, 1, 2, 1, 4, 4, 1, 3, 2, 0, 2, 1, 0, 3, 0, 4, 4, 2, 4,         *       2, 1, 1, 1, 0, 2, 4, 4, 3, 3, 1, 3, 3, 0, 0, 2, 1, 3, 4,	Ø, 3, 2,
-	1: 2: 3: 4: 5: 6: 7: 8:		SUBROUTINE       BLK2C         DIMENSION       ISTM(100),XRT(100)         DATA       ISTM/0,1,1,0,2,0,4,4,1,3,3,1,0,1,1,3,0,1,2,         *       2,1,2,2,3,3,3,0,2,1,4,0,4,2,2,1,4,3,2,         *       0,4,2,1,4,4,1,3,2,0,2,1,0,3,0,4,4,2,4,         *       0,4,2,1,4,4,1,3,2,0,2,1,0,3,0,4,4,2,4,         *       2,1,1,0,2,4,4,3,3,1,3,3,0,0,2,1,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4	Ø, 3, 2,
-	1: 2: 3: 4: 5: 6: 7: 8: 9:	1000	SUBROUTINE       BLK2C         DIMENSION       ISTM(100),XRT(100)         DATA       ISTM/0,1,1,0,2,0,4,4,1,3,3,1,0,1,1,3,0,1,2,         *       2,1,2,2,3,3,3,0,2,1,4,0,4,2,2,1,4,3,2,         *       2,4,2,1,4,4,1,3,2,0,2,1,0,3,0,4,4,2,4,         *       2,1,2,2,3,3,1,3,2,0,2,1,0,3,0,4,4,2,4,         *       2,1,1,1,0,2,4,4,3,3,1,3,3,0,0,2,1,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4	Ø, 3, 2,
-	1: 2: 3: 4: 5: 6: 7: 8: 9: 10:		SUBROUTINE       BLK2C         DIMENSION       ISTM(100),XRT(100)         DATA       ISTM/0,1,1,0,2,0,4,4,1,3,3,1,0,1,1,3,0,1,2,         *       2,1,2,2,3,3,3,0,2,1,4,0,4,2,2,1,4,3,2,         *       0,4,2,1,4,4,1,3,2,0,2,1,0,3,0,4,4,2,4,         *       0,4,2,1,4,4,1,3,2,0,2,1,0,3,0,4,4,2,4,         *       2,1,1,1,0,2,4,4,3,3,1,3,3,0,0,2,1,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4	Ø, 3, 2,
-	1: 2: 3: 4: 5: 6: 7: 8: 9: 10: 11:		SUBROUTINE       BLK2C         DIMENSION       ISTM(100),XRT(100)         DATA       ISTM/0,1,1,0,2,0,4,4,1,3,3,1,0,1,1,3,0,1,2,         *       2,1,2,2,3,3,3,0,2,1,4,0,4,2,2,1,4,3,2,         *       0,4,2,1,4,4,1,3,2,0,2,1,0,3,0,4,4,2,4,         *       0,4,2,1,4,4,1,3,2,0,2,1,0,3,0,4,4,2,4,         *       2,1,1,1,0,2,4,4,3,3,1,3,3,0,0,2,1,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4	Ø, 3, 2,
-	1: 2: 3: 4: 5: 6: 7: 8: 9: 10:		SUBROUTINE       BLK2C         DIMENSION       ISTM(100),XRT(100)         DATA       ISTM/0,1,1,0,2,0,4,4,1,3,3,1,0,1,1,3,0,1,2,         *       2,1,2,2,3,3,3,0,2,1,4,0,4,2,2,1,4,3,2,         *       0,4,2,1,4,4,1,3,2,0,2,1,0,3,0,4,4,2,4,         *       0,4,2,1,4,4,1,3,2,0,2,1,0,3,0,4,4,2,4,         *       2,1,1,1,0,2,4,4,3,3,1,3,3,0,0,2,1,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4	Ø, 3, 2,
-	1: 2: 3: 4: 5: 6: 7: 8: 9: 10: 11:		SUBROUTINE       BLK2C         DIMENSION       ISTM(100),XRT(100)         DATA       ISTM/0,1,1,0,2,0,4,4,1,3,3,1,0,1,1,3,0,1,2,         *       2,1,2,2,3,3,3,0,2,1,4,0,4,2,2,1,4,3,2,         *       0,4,2,1,4,4,1,3,2,0,2,1,0,3,0,4,4,2,4,         *       0,4,2,1,4,4,1,3,2,0,2,1,0,3,0,4,4,2,4,         *       2,1,1,1,0,2,4,4,3,3,1,3,3,0,0,2,1,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4	Ø, 3, 2,
-	1: 2: 3: 4: 5: 6: 7: 8: 9: 10: 11: 12: 13:		SUBROUTINE BLK2C DIMENSION ISTM(100),XRT(100) DATA ISTM/0,1,1,0,2,0,4,4,1,3,3,1,0,1,1,3,0,1,2, * 2,1,2,2,3,3,3,0,2,1,4,0,4,2,2,1,4,3,2, * 0,4,2,1,4,4,1,3,2,0,2,1,0,3,0,4,4,2,4, * 2,1,1,1,0,2,4,4,3,3,1,3,3,0,0,2,1,3,4, * 4,1,3,4,2,3,3,1,4,2,0,2,0,4,4,0,3,4,0, WRITE(2,1000) FORMAT('BLOCK 2READY ?') CALL BLK0C(ISTM,XRT) CALL FL2 REWIND 8 WRITE(8)ISTM,XRT	Ø, 3, 2,
-	1: 2: 3: 4: 5: 6: 7: 8: 9: 10: 11: 12: 13: 14:		SUBROUTINE BLK2C DIMENSION ISTM(100),XRT(100) DATA ISTM/0,1,1,0,2,0,4,4,1,3,3,1,0,1,1,3,0,1,2, * 2,1,2,2,3,3,3,0,2,1,4,0,4,2,2,1,4,3,2, * 0,4,2,1,4,4,1,3,2,0,2,1,0,3,0,4,4,2,4, * 2,1,1,1,0,2,4,4,3,3,1,3,3,0,0,2,1,3,4, * 4,1,3,4,2,3,3,1,4,2,0,2,0,4,4,0,3,4,0, WRITE(2,1000) FORMAT('BLOCK 2READY ?') CALL BLK0C(ISTM,XRT) CALL FL2 REWIND 8 WRITE(8)ISTM,XRT RETURN	Ø, 3, 2,
-	1: 2: 3: 4: 5: 6: 7: 8: 9: 10: 11: 12: 13:		SUBROUTINE BLK2C DIMENSION ISTM(100),XRT(100) DATA ISTM/0,1,1,0,2,0,4,4,1,3,3,1,0,1,1,3,0,1,2, * 2,1,2,2,3,3,3,0,2,1,4,0,4,2,2,1,4,3,2, * 0,4,2,1,4,4,1,3,2,0,2,1,0,3,0,4,4,2,4, * 2,1,1,1,0,2,4,4,3,3,1,3,3,0,0,2,1,3,4, * 4,1,3,4,2,3,3,1,4,2,0,2,0,4,4,0,3,4,0, WRITE(2,1000) FORMAT('BLOCK 2READY ?') CALL BLK0C(ISTM,XRT) CALL FL2 REWIND 8 WRITE(8)ISTM,XRT	Ø, 3, 2,
-	1: 2: 3: 4: 5: 6: 7: 8: 9: 10: 11: 12: 13: 14:		SUBROUTINE BLK2C DIMENSION ISTM(100),XRT(100) DATA ISTM/0,1,1,0,2,0,4,4,1,3,3,1,0,1,1,3,0,1,2, * 2,1,2,2,3,3,3,0,2,1,4,0,4,2,2,1,4,3,2, * 0,4,2,1,4,4,1,3,2,0,2,1,0,3,0,4,4,2,4, * 2,1,1,1,0,2,4,4,3,3,1,3,3,0,0,2,1,3,4, * 4,1,3,4,2,3,3,1,4,2,0,2,0,4,4,0,3,4,0, WRITE(2,1000) FORMAT('BLOCK 2READY ?') CALL BLK0C(ISTM,XRT) CALL FL2 REWIND 8 WRITE(8)ISTM,XRT RETURN	Ø, 3, 2,
-	1: 2: 3: 4: 5: 6: 7: 8: 9: 10: 11: 12: 13: 14:		SUBROUTINE BLK2C DIMENSION ISTM(100),XRT(100) DATA ISTM/0,1,1,0,2,0,4,4,1,3,3,1,0,1,1,3,0,1,2, * 2,1,2,2,3,3,3,0,2,1,4,0,4,2,2,1,4,3,2, * 0,4,2,1,4,4,1,3,2,0,2,1,0,3,0,4,4,2,4, * 2,1,1,1,0,2,4,4,3,3,1,3,3,0,0,2,1,3,4, * 4,1,3,4,2,3,3,1,4,2,0,2,0,4,4,0,3,4,0, WRITE(2,1000) FORMAT('BLOCK 2READY ?') CALL BLK0C(ISTM,XRT) CALL FL2 REWIND 8 WRITE(8)ISTM,XRT RETURN	Ø, 3, 2,

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	SRT.C.D	4	•									
-	1: 2: 3: 4: 5: 6:	. :	SUBROUTINE DIMENSION I DATA ISTM, * *	CTM(100)	, Ø, 4, 4 , 2, 4, 2 , 4, 2, Ø , 7, 7, 3	2321. 0200. 224. 1211	, 1, 2, , 0, 2, , 4, 2,	. 60 65 0 60 6 0 60 6	3, 3, 1 3, 1, 2 1, 3, 2	s 4s 3 s 3s 3	, 4, 5 4, 6 5, 6 6, 6	3.2 1.2
	7: 8: 9: 10: 11: 12: 13:	1000	WRITE(2,10 FORMAT('EL CALL BLX0C CALL FL3 REWIND 8 WRITE(8)IS	00) )CK 3 (ISTM.XR	READY		· ·	·			•	
	14:		RETURN							•		
	15:		EN D			·		1				
$\left( \right)$												
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	SET.C.	D 5										
	1: 2:		SUBROUTINE DIMENSION	ISTM(100						_		
	3:		DATA ISTM	: د0 د0 د0/ ( د0 د1 د2								
1	5:		*	3, 1, 2, 4								
	6:		*	2, 0, 1, 3								
	7: 8:		WRITE(2,10	2,2,4,1 100)	، و4 وي و	4, 1, 2	20 40, 10	• <u>1</u> • <u>1</u> •	60 60	2 2 2 2 2	25 35	67
	. 9:	1000	FORMAT('BL			?')						
	10:		CALL BLKØC CALL FL4	(I STM, XF	<b>ττ)</b> .				•			
	12:		REWIND 8	•	•		•					
	13:		WRITE(8)IS	TM,XRT								
	14: 15:		RETURN EN D	•								
$  \cap$									•			
			-			•						

	SRT.C.D	6													
	SHI C.D	-			·	14									
	1:	SU	EROUTINE	BLK		NDT/	1001								
	2:		MENSION	1 STM ( /3,4,	100).	, XRIC	1007		0.1	. // .	2.0	. ø.	1.0	4 4	2,
-	3:		TA ISTM	13,4,	1 - 10 -	3, 1, 1 3, 2, 3	), (), () , (), (), (), (), (), (), (), (), (), ()	() () . ().	1.3	. /1.	2.1	. 2.	4.0	د 4 و ا	ø,
	4:	*		3,4,	100	ن وج ون 6 و4 و3	ي وي ور ۱ ، ۲	رب دن د ا	2.0		2.1	. 1.	1.0	1.2.	2,
	5:	*		4,3,	0,3,	3, 4, 6 1, 2, 3		وی وا ص	2.2	. 1.	1.1	. 2.	2.0	2.2	. Ø.
-	6:	*		2. 1.	1220	1,2,3	5, 2, 2, 2	وی وړ د د	J. 1	. 1.	0.3	. 2	1.1	1.4.	. 4/
	7:	*			د3 و4	4, Ø, 3	يا وكا وك	د] د()	4, 1.	. 1.2	610	5 6.5		12 -12	
	8:	WR	ITE(2,10	(00)			~ • • •				·				
	9: 1		RHAT( BL				3.0								
	10:		LL BLKØC	(ISTM	,XRT	)		•							
	11:		LL FL5			•									
	12:	RE	WIND 8												
	13:	. VR	ITE(8)IS	STM - XR	Т										
	14:	RE	TURN												
·	15:	EN	D												
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	SRT.C.D	7						÷.,							•
	Sici • 0 • D	•		Έ.											
	1:	SU	BROUTINE	BLK	60										
	2:		MENSION		•	.XET(	100	,							
	3:			14, 1,					2.0	. 2.	1. 2		a./	h. //.	a
	4:	*	IN IDU			1,2,3									
	5:	*				Ø, 3, 2									
• .	6:	*				3,3,0									
	о: 7:	*				3, 3, 4 Ø, Ø, 2									
	/: 8:	-	ITE(2,10		وے ون	2 (1) (1)	נ נש נ	() ()	با ون	وي ا	43 6	• ~ •	4,1 2	دري در	21
	÷ ·		EMAT('BL		P	FADV	211								· .
							t . 1								
	10:		LL BLKØD	CI 2141	, ARI										
	• • •	UA	LL FL6							•					
	11:		TT MID O												
	12:	RE	WIND 8		- ·		•								
	12: 13:	RE WR	ITE(8)IS	TM, XR	r .		•				`				
	12: 13: 14:	RE WR RE	ITE(8)IS TURN	TM, XR	Г		•				<b>`</b> .				
	12: 13:	RE WR	ITE(8)IS TURN	тм, х г	r .		•				•				
	12: 13: 14:	RE WR RE	ITE(8)IS TURN	TM , X R'	r ·	· ·	•				•				

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 SRT.C.D	8		· · ·		• .								
1: 2: 3: 4: 5: 6: 7: 8: 9: 10: 11: 12: 13: 14: 15:	1000	SUBROU DIMENS DATA * * * * * * * * * * * * * * * * * *	ON IS STM/0 2 2.1000 ('BLOC LK0D(I _7 8	8, 2, 0, 3, 3, 3, 3, 1, 1, 2, 0, 0, 2, 4, 1, 3) CK 7	0), ) 1, 1, 3, 3, 1, 2, 3, 3, 3, 2, . REA	4, 4, 2, 4, 3, 4, 1, 3, 3, 2,	, 3, 3, , 3, 4, , 1, 4, , 1, 0, , 2, 1,	Ø, 2, 3, 2, 1, 4,	1, 2, 4 1, 2, 1 0, 0, 1	o 1o 8o o 8o 4o o 2o 4o	1 = 3 = 3 = 2 = 3 = Ø =	C, 2, 4, 1, 4, 4,	
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SRT . C . D 9

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		1:		SUB	ROU	LINE	Ė	BLK	8 D									,								
		2:		DIM	EN SI	ON	157	îM (	10	Ø)	۶X	RT	C 1	ØØ	)						•					
-,		3:		DAT	A J	STM	12,	4,	2,	4,	2,	1,	1,	2,	4,	4,	2,	2,	1,	ø,	2,	ø,	1,	3,	3,	ø,
		4:		*			4,	Ø,	3,	2,	4,	2,	2,	3,	4,	1,	4,	1,	ь	Ø,	1,	3,	1,	3,	Ø,	1.
		5:		*			2,	3,	2,	1,	4,	Ø,	2,	1,	3,	з,	1,	2,	4,	4,	Ь	2,	4,	Ø,	4,	12
•		6:		*			ø,	4,	4,	1,	3,	4,	Ø,	1,	3,	ø,	Ø,	3,	Ø,	ø,	3,	e,	2,	4,	3,	1.
	•	7:		*			2,	3,	Ø,	2,	1,	ø,	2,	2,	ø,	3,	4,	з,	ь	4,	3,	4,	ø,	Ø,	3,	3/
	•	8:		WRI	TE(2	2,10	ØØ)																			
		9:	1000	FOR	MAT	'BL	0 CK	: 8	• •	• R	EA	DY	?	• >	•											
		10:		CAL	L BL	.KØD	(IS	ТM	۶X	RΤ	)													-		
		11:		CAL	L FL	.8																				
		12:		REW	IND	8																			·	
		13:		WRI	TE(8	) I S	TM 🤊	XR	Т										•							
		14:		RET	URN																					
		15:		EN D																						
$\bigcirc$																									. <b>.</b> .	
$\cup$																										

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1:	SUBROUTIN	E BLK9 D
2:	DIMENCION	ISTM(100), XRT(100)
3:	DATA IST	M/1, 3, 2, 1, 4, 3, 4, 4, 1, 4, 4, 3, 4, 0, 0, 1, 3, 4, 2, 2, 2,
4:	*	3, 0, 2, 4, 0, 0, 1, 1, 3, 3, 4, 4, 0, 3, 1, 0, 0, 4, 0, 0,
5:	*	2, 3, 2, 3, 0, 2, 4, 4, 2, 2, 4, 0, 2, 1, 2, 3, 2, 0, 1, 1,
6:	*	1, 3, 1, 1, 1, 2, 2, 0, 4, 0, 0, 1, 1, 4, 4, 1, 0, 3, 2, 2,
7:	*	2, 3, 0, 3, 1, 3, 3, 1, 4, 1, 0, 0, 2, 3, 2, 3, 4, 3, 4, 2/
8:	WRITE(2,1	
9:		BLOCK 9 · · · READY ? ')
10:	CALL BLKØ	JD(ISTM, XRT)
11:	CALL FL9	
12:	REWIND 8	
13:	WRITE(8)I	STM, XRT
14:	RETURN	
15:	EN D	

SRT.C.D 11

	1:		S	UBRO	UT	INE	Ē	3L.K	A	) <sup>·</sup>													•			
	2:		E	I M EN	ISI	ON .	I 51	M C	10	ØØ)	۶X	R	( I	ØØ	<b>D</b> -											
-	3:		Σ	ATA	I.	S TM.	/3,	1,	4,	2,	з,	4,	4,	4,	1,	ø,	Ø,	2,	ø,	3,	ø,	2,	ø,	2,	1,,	3,
	4:		*				0,	Ø,	з,	1,	1,	0,	و4	4,	ø,	1,	2,	2,	4,	2,	3,	ø,	Ø,	3,	ø,	4,
	5:		*				3,	1,	2,	4,	Ø,	3,	4,	4,	2,	ø,	2,	1,	3,	1,	1,	3,	ø,	3,	1,	D
<b>'</b>	6:		*				Ø,	4,	4,	2,	Ø,	2,	3,	4,	4,	1,	ø,	2,	Ø,	4,	4,	4,	2,	2,	2,	3,
	7:		*				з,	2,	3,	2,	1,	3,	1,	4,	1,	4,	1,	3,	2,	1,,	3,	Ø,	3,	2,	1,	1/
	8:		W	RITI	C 2.	10	ØØ)																			
	9:	1000	F	0 RM A	T	BL	оск	: 1	ø.	• •	RE	A	Y	? '	)											
	10:		С	ALL	BLI	٢ØD	(15	зтΜ	۶X	RT	`)															
	11:		С	ALL	FL	A																				
•	12:		R	EWIN	D	3																				
	13:		W	RITE	(8)	15	ΤM,	ΧF	T								$\phi_{\rm eff}$									•
	14:		F	ETUF	N																					
	15:	- e	E	ND			•																			
$\cap$														· •												

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1:		SUBROUTINE ELKOC(ISTM, XRT)
2:	С	
3:	_	DIMENSION ISTM(100), XRT(100)
4:	C	PEAR(1, 1001) A
5:		READ( 1, 1001) A
	1001	FORMAT(A4)
7:	100	CALL INF40(IRES)
8:		IF(IRES.EQ.Ø)GO TO 100
9:		CALL INTLIM
	101	CALL TNR(I 10MS, ISEC)
11:		IF(I1045.LT.50)GO TO 101
12:		CALL OUT40(128)
	102	CALL INP41(IRES)
14:		IF(IRES.EQ.0)GO TO 102
15:		CALL OUT40(Ø)
16:		DO 110 I I= $1 \cdot 2$
17:		CALL INTLTM CALL TMR(I10MS,ISEC)
	111	
19:		IF(ISEC.LT.2)G0 TO 111 CALL OUT40(128)
20:		CALL INP41(IRES)
	112	IF(IRES.EC.0)G0 TO 112
22:		CALL OUT40(0)
23:		CONTINUE
	110	$D0 \ 200 \ I 2= 1, 100$
25:		CALL INTLIM
26: 27:		I 2 1= I STM(I 2)
28:		ITI = 100
	0.01	IF(I2Ì•EQ•@)GO TO 211
30:		ITI=IFIX(FLOAT(ITI)*1.3)
31:		I 2 1=I 2 1- 1
32:		GO TO 201
	211	CALL TMR(I 10MS, ISEC)
34:	<i>L</i> · · ·	IF(I10MS.LT.ITI)G0 TO 211
35:		CALL OUT40(128)
36:		CALL INTLIM
	212	CALL INP41(IRES)
38:		CALL TMR(I 10MS, I SEC)
39:		IF(IRES.EQ.Ø)GO TO 212
40:		CALL $OUT40(0)$
41:		XRT(12)=FLOAT(110M5)/100.0
	200	CONTINUE
43:		CALL OWARI
44:		RETURN
45:		END

1:		SUBROUTINE BLKØD(ISTM,XRT)
2:	C	
3:		DIMENSION ISTM(100), XRT(100)
4:	С	
5:		READ( 1, 1001) A
6:	1001	FOFMAT(A4)
7:		DO 110 I 1=1.2
8:		CALL BUZZER
9:		CALL INTLIM
10:	111	
11:		IF(ISEC+LT+2)G0 TO 111
12:	· · ·	CALL OUT40(128)
13:	112	CALL INP41(IRES)
14:		IF(IRES.EQ.0)GO TO 112
15:		CALL OUT40(0)
16:	110	CONTINUE
17:		DO 200 I 2= 1, 100
18:		CALL BUZZER
19:		CALL INTLTM
20:		I 21=I STM(I 2)
21:		I TI = 100
22:	201	IF(121.EQ.Ø)GO TO 211
23:		ITI=IFIX(FLOAT(ITI)*1.3)
24:		I 2 I=I 2 I-I
25:		GO TO 201
26:	211	CALL TMR(I 10MS, I SEC)
27:		IF(I10MS.LT.ITI)GO TO 211
28:		CALL OUT40(128)
29:		CALL INTLIM
3Ø:	212	CALL INP41(IRES)
31:		CALL TMR(IIØMS,ISEC)
32:		IF(IRES.EQ.0)GO TO 212
33:		CALL OUT40(0)
34:		XRT(I2)=FLOAT(I10M5)/100.0
35:	200	CONTINUE
36:		CALL OWARI
37:		RETURN
38:	•	EN D

1:		SUBROUTINE BUZZER
2:		CALL INTLIM
3:	300	CALL TMR(I1045, ISEC)
4:		CALL INP40(IRES)
5:		IF(IRES.NE.0)GO TO 400
6:		IF(I1045.LT.50)G0 TO 300
7:		CALL INTLIM
8:		CALL OUT41(128)
9:	100	CALL TMR(IIØMS, ISEC)
10:		CALL INF40(IRES)
11:		IF(IRES.NE.Ø)GO TO 400
12:		IF(I10MS.LT.20)GO TO 100
13:	420	CALL OUT41(Ø)
14:		CALL INTLIM
15:	500	CALL TMR(I 10MS, ISEC)
16:		CALL INP40(IRES)
17:		IF(IRES.NE.0)G0 TO 400
18:		IF(I10MS.LT.10)GO TO 500
19:	200	CALL INF40(IRES)
20:		IF(IRES.EC.Ø)GO TO 200
21:		RETURN
22:	С	
23:	400	CALL INP4Ø(IRES)
24:		CALL OUT41(128)
25:		IF(IRES.NE.0)GO TO 400
26:		CALL INTLIM
27:	410	CALL TMR(I10MS,ISEC)
28:		IF(ISEC.LT.5)GO TO 410
29:		GO TO 420
3Ø:	С	
31:		EN D

	SRT.C.I	D 15				
	1:		SUBROUTINE DTANL 1	•		
	2:	c				
	3:	U	DIMENSION ISTM(100), XRT(100)			
	4:	C		•		•
	5:	U	CALL FLI			
	6:		REWIND 8			
	7:		READ(8) I STM, XRT			
	8:		WRITE(6, 1000)			
	9:	1000				
	10:		* 1X, 5('ITI RT(SEC) '),//)			
	11:		CALL DTANL @(ISTM, XRT)			
	12:		RETURN			
	. 13:		EN D			
					•	
•				•		
		·	e a la companya and a companya companya and and a companya and a companya and a companya and a companya and a c	•	• •• ••	
	-		· · · ·			
•						
	SRT.C.	D 16				
	541+0+	0 10				
	1:		SUEROUTINE DTANL 2			
	-	С		1	•	
	3:		DIMENSION ISTM(100), XRT(100)			
•	4:		· · · · · · · · · · · · · · · · · · ·			
	5:		CALL FL2			
	6:		REVIND 8			
	7:		READ(8) I STM, XRT			
	5:		WRITE(6, 1000)			

9: 1000 FORMAT(1H1, 10%, 'DATA OF BLOCK 2'/// 10: \* 1X, 5('ITI RT(SEC) '),//) 11: CALL DTANL0(ISTM, XRT) 12: RETURN

END

SRT.C.D 17

13:

1:	. •	SUBROUTINE DTANL 3
2: 3:	C	DIMENSION ISTM(100),XRT(100)
	С	DIMENSION ISIMCIDE/JARTCIDE/
	C	
5:		CALL FL3
6:		REWIND 8
7:		READ(8)ISTM, XRT
8:		WRITE(6, 1000)
9:	1000	FORMAT(1H1, 10X, 'DATA OF BLOCK 3'///
10:		* 1X,5('ITI RT(SEC) '),//)
11:	*	CALL DTANLØ(ISTM,XRT)
12:		RETURN
13:		EN D

SRT.C.D 13	
1:	SUBROUTINE DTANL 4
2: C	
3:	DIMENSION ISTM(100), XRT(100)
4: C	
5:	CALL FL4
. 6:	REWIND 8
7:	READ(8) I STM, X RT
8:	WRITE(6, 1000)
	FORMANCHINA LONG IDAMA OF DIAGU

9: 1000 FORMAT(1H1, 10%, 'DATA OF BLOCK 4'/// 1X, 5('ITI ET(SEC) '),//) 10: \* CALL DTANL G(ISTM, XRT) 11: RETURN 12: EN D

SRT.C.D 19 1: . SUBROUTINE DTANL5 2: C 3: DIMENSION ISTM(100), XRT(100) 4: C 5: CALL FL5 6: REWIND 8 7: READ(8) I STM, XRT 8: WRITE(6, 1000) 9: 1000 FORMAT(1H1, 10%, 'DATA OF BLOCK 5'/// 10: \* 1X, 5('ITI RT(SEC) '),//) 11: CALL DTANLØ(ISTM, XRT) 12: RETUEN 13: EN D

SRT.C.D 20

13:

SUBROUTINE DTANL 6 1: 2: C 3: DIMENSION ISTM(100), XRT(100) 4: C 5: CALL FL6 6: REWIND 8 7: READ(8) I STM, XRT 8: WRITE(6, 1000) 9: 1000 FORMAT( 1H1, 10X, 'DATA OF BLOCK 6'/// 10: 1X, 5('ITI RT(SEC) '),//) 11: CALL DTANLØ(ISTM,XRT) 12: RETURN 13: END

SRT. C. D 21	
1:	SUBROUTINE DTANL 7
2: C	· · · · · · · · · · · · · · · · · · ·
3:	DIMENSION ISTM(100), XRT(100)
4: C	
5:	CALL FL7
6:	REWIND 8
7:	READ(8) I STM, XRT
8:	WRITE(6, 1000)

9: 1000 FORMAT( 1H1, 10X, 'DATA OF BLOCK 7'///

10:	*	1X, 5('I TI	RT(SEC)	122/12
11:	CALL 1	DTANLØ(ISTM)	XRT)	
12:	RETURN	J		÷
13:	EN D	1		
		· · · · · · · · · · · · · · · · · · ·		

SRT.C.D 22

1: 2:	SUBROUTIN	E DTANL8
3:	DIMENSION	ISTM(100), XRT(100)
5:	CALL FL8	
6:	REWIND 8	
7:	READ(8)IS1	M, XRT
8:	WRITE(6,10	300)
9:	1000 FORMAT(IH)	1. 10X, 'DATA OF BLOCK 8'///
10:	· * 1X,	5('ITI RT(SEC) '),//)
11:		Ø(ISTM, XRT)
12:	RETURN	
13:	EN D	

SRT . C . D 23 1: SUBROUTINE DTANL9 2: C DIMENSION ISTM(100), XRT(100) 3: 4: C CALL FL9 5: REWIND 8 6: READ(8) I STM, XRT 7: WRITE(6, 1000) 8: 9: 1000 FORMAT( 1H 1, 10X, 'DATA OF BLOCK 9'/// \* 1X,5('ITI RT(SEC) '),//) 10: CALL DTANLØ(ISTM, XRT) 11: RETURN 12: 13: EN D

31///
')
1

		CUEDOUTINE DEANI GLICEN YEEN
1:	-	SUBROUTINE DTANLØ(ISTM,XRT)
2:	U	$\mathbf{P}_{\mathbf{M}} = \mathbf{P}_{\mathbf{M}} + $
្ម 3 ៖		DIMENSION ISTM(100), XRT(100), XITI(5), XTBL(5, 5, 10),
4:		* JTBL(5,5),XSTM(5),XXRT(5)
5:	С	
6:		D0 $100 I I = 1.20$
7:		DO 110 I 1 I= 1, 5
8:		J 1= (I 1- 1) * 5+ I 1 1
9:		XXRT(I11)=XRT(J1)
10:		K STM= 100
11:		KSTP=ISTM(J1)
12:	112	IF(KSTP-EQ-0)GO TO 111
13:		KSTM=IFIX(FLOAT(KSTM)*1.3)
14:		KSTP=KSTP-1
15:		GO TO 112
16:	111	XSTM(I11)=FLOAT(KSTM)/100.0
17:	110	CONTINUE
18:		WRITE(6,1100)(XSTM(J1),XXRT(J1),J1=1,5)
19:	1100	FORMAT(1X, 5(F5.2, F6.2, 3X))
20:	100	CONTINUE
21:		
22:		
23:	v	DO 200 I2=1,5
24:		DO 201 I21=1,5
25:		DO 202 I 22= 1, 10
26:		XTBL(12,121,122)=99999.9
	202	CONTINUE
27:	202	$JTBL(12, 121) = \emptyset$
28:	201	CONTINUE
29:		
30:	200	CONTINUE
31:		K2=ISTM(1)+1 D0 210 I2=2,100
32:		
33:		K1=K2
34:		$X_2 = I STM(I_2) + 1$
35:		JTBL(K1, K2) = JTBL(K1, K2) + 1
36:		$K_3=JTBL(K_1,K_2)$
37:		XTBL(K1, K2, K3) = XRT(12)
38 <b>:</b>	210	CONTINUE
39 :		KITI = 100
40:		DO 300 I 3=1.5
41:		$XITI(I3) = FLOAT(KITI) / 100 \cdot 0$
42:		KITI=IFIX(FLOAT(KITI)*1.3)
43:	300	CONTINUE
44:		WEITÉ(6,2000)
45:	2000	FORMAT(1H1, 5X, 'CONTINGENCY TABLES')
46:		DO 400 I 4= 1, 5
47:		WRITE(6,2100)XITI(I4),(XITI(J4),J4=1,5)
48:	2100	FORMAT(///15%, 'RT''S FOR', F5.2, 1%, 'SEC. FP'//
49:		* 12X, 'CONTINGENT ON FREVILUOS FF''S.'//
50:		* 10X, 5(F5.2, 'SEC. ')//)
51:		WRI TE(6, 2200)((XTEL(JK 1, I 4, JK2), JK 1= 1, 5), JK2= 1, 10)
	2200	FORMAT(10(10x, 5(F5.2, 5x),/))
	400	CONTINUE
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54:	С	
55:	С	
56:		RETURN
 57:		EN D

The program for the discrete(in session 1)-

then-continuous(in session 2) condition.

SRT.D.C 1 \*\*\*\*\*\* 1: C 2: C ÷ ÷ MAIN PROGRAMM 3: C \* 4: C то \* 5: C \* CONTROL THE SIMPLE REACTION TIME 6: C \* 7: C EXPERIMENT \* 8: C (DISCRETE-CONTINUOUS CONTEXT) \* 9: C \* 10: C 11: C 12: 0 INSTRUMENT LAYOUT 13: C 14: C 0UT4Ø 0UT41 INP40 INF41 15: C 16: C LED START RESFONSE 17: C BIT7 BUZZER 18: C 19: C 20: DIMENSION A1(15), A3(15), A4(15) 21: C CALL OUT40(0) 22: CALL OUT41(0) 23: 24: WRITE(2, 1200) 25: 1200 FOFMAT(//'DISCRETE-CONTINUOUS CONTEXT CONDITION.'//) 26: WRITE(2, 1000) 27: 1000 FORMAT('SUEJECT NAME ?') 28: READ( 1, 1100) A1 29: 1100 FORMAT(15A4) 30: WRITE(2, 1300) 31: 1300 FORMAT('START TIME ?') 32: READ( 1, 1100) A3 CALL BLKID 33: CALL ELK2D 34: CALL BLK3D 35: CALL ELK4D 36: 37: CALL BLK5D WRITE(2,4000) 38: 39: 4000 FORMAT(///'CONTEXT WILL CHANGE.'/ 40: \* 'ATTENTION FLEASE !'//) CALL BLK6C 41: CALL BLK7C 42: CALL BLX8C 43: CALL BLK9C 44: 45: CALL ELKAC 46: WRITE(2, 1400) 47: 1400 FORMAT( 'END TIME ?') 48: READ(1, 1100)A4 49: WRITE(6, 2000) AL, A3, A4 FORMAT(1H1, 10(/), 10X, 50: 2000 \* '\*\*\*\* DISCRETE-CONTINUOUS CONTEXT '\*\*\*\*' 51: \* ///,3(10X,15A4//)) 52: 53: CALL DTANL 1

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SET.D.C 1

54:	CALL DTANL 2
55:	CALL DTANL 3
56:	CALL DTANL 4
57:	CALL DTANL 5
5 <b>8 :</b>	CALL DTANL6 ·
59:	CALL DTANL 7
60:	CALL DTANL8
61:	CALL DTANL9
62:	CALL DTANLA
63:	WEITE(6,3000)
64: 3000	FOEMAT(1H1,10(/))
65:	STOP
66:	EN D

. .

			2		
		SRT.D.C	5	CUPROLITINE BLXID	
	•	1:		$SUBROUTION ISTM(100) \times RT(100)$	
		2:			
	-	3:		(A) 22 42 42 42 42 42 42 42 42 42 42 42 42	
		4:		1, 3, 2, 6, 1, 2, 4, 0, 4, 1, 1, 0, 1, 1, 0, 0, 3, 3, 4,	
		5:		* 1, 3, 2, 0, 1, 2, 4, 0, 4, 4, 3, 4, 3, 2, 4, 0, 0, 3, 3, 3, 4, * 1, 4, 3, 2, 0, 1, 1, 1, 4, 0, 1, 3, 1, 1, 0, 0, 3, 3, 3, 4, 1, 4, 3, 2, 0, 1, 1, 1, 4, 0, 1, 3, 1, 1, 0, 0, 2, 3, 1, 1/	
		6:		* 1, 4, 3, 2, 0, 1, 1, 1, 4, 0, 1, 3, 1, 1, 0, 0, 2, 3, 1, 1/ * 1, 1, 1, 4, 2, 2, 4, 2, 2, 2, 0, 2, 2, 1, 0, 0, 2, 3, 1, 1/	
		7:			
		8:		FORMATC'BLOCK I ALADI	
		9:	1000	CALL BLKOD(ISTM, XBT)	
		10:		CALL FL1	
•		11:		EFWIND 8	
		12:		WEITE(8) I STM, XRT	
1		14:		RETURN	
ł		14.		EN D.	
1		10.			
	( i	х.			
		· · · · · · · · · · · · · · · · · · ·			
		. <u>.</u>			
		SPT. D. (			
		SRT.D.C	; 3		
	• • •	SRT • D • C	; 3	SUBROUTINE BLX2D	
			; 3		
	 - - 	1:	; 3	SUBROUTINE BLK2D	
		1: 2:	; 3	SUBROUTINE BLK2D DIMENSION ISTM(100),XRT(100)	
		1: 2: 3: 4: 5:	3	SUBROUTINE       BLK2D         DIMENSION       ISTM(100),XRT(100)         DATA       ISTM/0, 1, 1, 0, 2, 0, 4, 4, 1, 3, 3, 1, 0, 1, 1, 3, 0, 1, 2, 3,         *       2, 1, 2, 2, 3, 3, 3, 0, 2, 1, 4, 0, 4, 2, 2, 1, 4, 3, 2, 0,         *       0, 4, 2, 1, 4, 4, 1, 3, 2, 0, 2, 1, 0, 3, 0, 4, 4, 2, 4, 3,	
		1: 2: 3: 4: 5: 6:	3	SUBROUTINE       BLK2D         DIMENSION       ISTM(100),XRT(100)         DATA       ISTM/0, 1, 1, 0, 2, 0, 4, 4, 1, 3, 3, 1, 0, 1, 1, 3, 0, 1, 2, 3,         *       2, 1, 2, 2, 3, 3, 3, 0, 2, 1, 4, 0, 4, 2, 2, 1, 4, 3, 2, 0,         *       0, 4, 2, 1, 4, 4, 1, 3, 2, 0, 2, 1, 0, 3, 0, 4, 4, 2, 4, 3,         *       2, 1, 1, 1, 0, 2, 4, 4, 3, 3, 1, 3, 3, 0, 0, 2, 1, 3, 4, 2,	
		1: 2: 3: 4: 5: 6: 7:	3	SUEROUTINE       ELK2D         DIMENSION       ISTM(100),XRT(100)         DATA       ISTM/0, 1, 1, 0, 2, 0, 4, 4, 1, 3, 3, 1, 0, 1, 1, 3, 0, 1, 2, 3,         *       2, 1, 2, 2, 3, 3, 3, 0, 2, 1, 4, 0, 4, 2, 2, 1, 4, 3, 2, 0,         *       0, 4, 2, 1, 4, 4, 1, 3, 2, 0, 2, 1, 0, 3, 0, 4, 4, 2, 4, 3,         *       0, 4, 2, 1, 4, 4, 1, 3, 2, 0, 2, 1, 0, 3, 0, 0, 2, 1, 3, 4, 2,         *       2, 1, 1, 1, 0, 2, 4, 4, 3, 3, 1, 3, 3, 0, 0, 2, 1, 3, 4, 2,         *       4, 1, 3, 4, 2, 3, 3, 1, 4, 2, 0, 2, 0, 4, 4, 0, 3, 4, 0, 0, 2, 4, 0, 0, 2, 4, 4, 0, 3, 4, 0, 0, 3, 4, 0, 0, 3, 4, 0, 0, 3, 4, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	· ·
		1: 2: 3: 4: 5: 6: 7: 8:	•	SUEROUTINE       BLK2D         DIMENSION ISTM(100),XRT(100)         DATA       ISTM/0, 1, 1, 0, 2, 0, 4, 4, 1, 3, 3, 1, 0, 1, 1, 3, 0, 1, 2, 3,         *       2, 1, 2, 2, 3, 3, 3, 0, 2, 1, 4, 0, 4, 2, 2, 1, 4, 3, 2, 0,         *       0, 4, 2, 1, 4, 4, 1, 3, 2, 0, 2, 1, 0, 3, 0, 4, 4, 2, 4, 3,         *       0, 4, 2, 1, 4, 4, 1, 3, 2, 0, 2, 1, 0, 3, 0, 0, 2, 1, 3, 4, 2, 4, 3,         *       2, 1, 1, 1, 0, 2, 4, 4, 3, 3, 1, 3, 3, 0, 0, 2, 1, 3, 4, 2, 4, 1, 3, 4, 2, 0, 2, 0, 4, 4, 0, 3, 4, 0, 0, 4, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	
		1: 2: 3: 4: 5: 6: 7: 8: 9:	3	SUEROUTINE       BLK2D         DIMENSION ISTM(100),XRT(100)         DATA       ISTM/0, 1, 1, 0, 2, 0, 4, 4, 1, 3, 3, 1, 0, 1, 1, 3, 0, 1, 2, 3,         *       2, 1, 2, 2, 3, 3, 3, 0, 2, 1, 4, 0, 4, 2, 2, 1, 4, 3, 2, 0,         *       0, 4, 2, 1, 4, 4, 1, 3, 2, 0, 2, 1, 0, 3, 0, 4, 4, 2, 4, 3,         *       0, 4, 2, 1, 4, 4, 1, 3, 2, 0, 2, 1, 0, 3, 0, 0, 2, 1, 3, 4, 2, 4, 3,         *       2, 1, 1, 1, 0, 2, 4, 4, 3, 3, 1, 3, 3, 0, 0, 2, 1, 3, 4, 2, 4, 1, 3, 4, 2, 0, 2, 0, 4, 4, 0, 3, 4, 0, 0, 4, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	
		1: 2: 3: 4: 5: 6: 7: 8: 9: 10:	•	SUEROUTINE       BLK2D         DIMENSION ISTM(100),XRT(100)         DATA       ISTM/0, 1, 1, 0, 2, 0, 4, 4, 1, 3, 3, 1, 0, 1, 1, 3, 0, 1, 2, 3,         *       2, 1, 2, 2, 3, 3, 3, 0, 2, 1, 4, 0, 4, 2, 2, 1, 4, 3, 2, 0,         *       0, 4, 2, 1, 4, 4, 1, 3, 2, 0, 2, 1, 0, 3, 0, 4, 4, 2, 4, 3,         *       2, 1, 1, 1, 0, 2, 4, 4, 3, 3, 1, 3, 3, 0, 0, 2, 1, 3, 4, 2,         *       4, 1, 3, 4, 2, 3, 3, 1, 4, 2, 0, 2, 0, 4, 4, 0, 3, 4, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	
		1: 2: 3: 4: 5: 6: 7: 8: 9: 10: 11:	•	SUEROUTINE ELX2D DIMENSION ISTM(100),XRT(100) DATA ISTM/0, 1, 1, 0, 2, 0, 4, 4, 1, 3, 3, 1, 0, 1, 1, 3, 0, 1, 2, 3, * 2, 1, 2, 2, 3, 3, 3, 0, 2, 1, 4, 0, 4, 2, 2, 1, 4, 3, 2, 0, * 0, 4, 2, 1, 4, 4, 1, 3, 2, 0, 2, 1, 0, 3, 0, 4, 4, 2, 4, 3, * 2, 1, 1, 1, 0, 2, 4, 4, 3, 3, 1, 3, 3, 0, 0, 2, 1, 3, 4, 2, * 4, 1, 3, 4, 2, 3, 3, 1, 4, 2, 0, 2, 0, 4, 4, 0, 3, 4, 0, 0/ WRITE(2, 1000) FORMAT('ELOCK 2READY ?') CALL ELX0D(ISTM,XRT) CALL FL2	
		1: 2: 3: 4: 5: 6: 7: 8: 9: 10: 11: 12:	•	SUEROUTINE ELX2D DIMENSION ISTM(100),XRT(100) DATA ISTM/0, 1, 1, 0, 2, 0, 4, 4, 1, 3, 3, 1, 0, 1, 1, 3, 0, 1, 2, 3, * 2, 1, 2, 2, 3, 3, 3, 0, 2, 1, 4, 0, 4, 2, 2, 1, 4, 3, 2, 0, * 0, 4, 2, 1, 4, 4, 1, 3, 2, 0, 2, 1, 0, 3, 0, 4, 4, 2, 4, 3, * 2, 1, 1, 1, 0, 2, 4, 4, 3, 3, 1, 3, 3, 0, 0, 2, 1, 3, 4, 2, * 4, 1, 3, 4, 2, 3, 3, 1, 4, 2, 0, 2, 0, 4, 4, 0, 3, 4, 0, 0/ WRITE(2, 1000) FORMAT('ELOCK 2READY ?') CALL ELX0D(ISTM,XRT) CALL FL2 REVIND 8	
		1: 2: 3: 4: 5: 6: 7: 8: 9: 10: 11: 12: 13:	•	SUEROUTINE ELX2D DIMENSION ISTM(100),XRT(100) DATA ISTM/0, 1, 1, 0, 2, 0, 4, 4, 1, 3, 3, 1, 0, 1, 1, 3, 0, 1, 2, 3, * 2, 1, 2, 2, 3, 3, 3, 0, 2, 1, 4, 0, 4, 2, 2, 1, 4, 3, 2, 0, * 0, 4, 2, 1, 4, 4, 1, 3, 2, 0, 2, 1, 0, 3, 0, 4, 4, 2, 4, 3, * 2, 1, 1, 1, 0, 2, 4, 4, 3, 3, 1, 3, 3, 0, 0, 2, 1, 3, 4, 2, * 4, 1, 3, 4, 2, 3, 3, 1, 4, 2, 0, 2, 0, 4, 4, 0, 3, 4, 0, 0/ WRITE(2, 1000) FORMAT('ELOCK 2READY ?') CALL ELX0D(ISTM,XRT) CALL FL2 REWIND 8 WRITE(8)ISTM,XRT	
		1: 2: 3: 4: 5: 6: 7: 8: 9: 10: 11: 12: 13: 14:	•	SUEROUTINE ELX2D DIMENSION ISTM(100),XRT(100) DATA ISTM/0,1,1,0,2,0,4,4,1,3,3,1,0,1,1,3,0,1,2,3, * 2,1,2,2,3,3,3,0,2,1,4,0,4,2,2,1,4,3,2,0, * 0,4,2,1,4,4,1,3,2,0,2,1,0,3,0,4,4,2,4,3, * 2,1,1,1,0,2,4,4,3,3,1,3,3,0,0,2,1,3,4,2, * 4,1,3,4,2,3,3,1,4,2,0,2,0,4,4,0,3,4,0,0/ WRITE(2,1000) FORMAT('ELOCK 2READY ?') CALL ELX0D(ISTM,XRT) CALL FL2 REWIND 8 WRITE(8)ISTM,XRT RETURN	
	•	1: 2: 3: 4: 5: 6: 7: 8: 9: 10: 11: 12: 13:	•	SUEROUTINE ELX2D DIMENSION ISTM(100),XRT(100) DATA ISTM/0, 1, 1, 0, 2, 0, 4, 4, 1, 3, 3, 1, 0, 1, 1, 3, 0, 1, 2, 3, * 2, 1, 2, 2, 3, 3, 3, 0, 2, 1, 4, 0, 4, 2, 2, 1, 4, 3, 2, 0, * 0, 4, 2, 1, 4, 4, 1, 3, 2, 0, 2, 1, 0, 3, 0, 4, 4, 2, 4, 3, * 2, 1, 1, 1, 0, 2, 4, 4, 3, 3, 1, 3, 3, 0, 0, 2, 1, 3, 4, 2, * 4, 1, 3, 4, 2, 3, 3, 1, 4, 2, 0, 2, 0, 4, 4, 0, 3, 4, 0, 0/ WRITE(2, 1000) FORMAT('ELOCK 2READY ?') CALL ELX0D(ISTM,XRT) CALL FL2 REWIND 8 WRITE(8)ISTM,XRT	

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-	SRT. D.C	4	÷					
	1:		SUBROUTINE					
	2:		DIMENSION				<b>.</b>	
	3:							1 2 1 4 4
	4:	×	k					• 1• Ø• 2• Ø• 1•
	5:	. *	ĸ	4, 4, C, 1.	, 4, 2, Ø, 2	e 40 00 20 20	e Øs Øs 3s 1s	, 2, 4, 3, 4, 3,
	6:	. ×	k ·					e 2o 3o 3o 0o 1o
	7:	k	k	3, 1, 2, 0.	, 4, Ø, 2, 3	80 40 30 31 SI	4, 2, 1, 4,	, Øs 3s 2s 1s 1/
	8:		WRITE(2,10	00)				
	9:	1000	FOFMAT('BL	OCK 3	READY ?'	>		
	10:		CALL BLKØD	(ISTM, XR	т)			
	11:		CALL FL3					•
	12:		REWIND 8	•			•	
	13:		WRITE(8)IS	THAXRT				
	14:		RETURN					
	15:		END					
				·				
							•	
•								
	-		1. A. A.					
				•				
						•		
••	-		· · · · · · · · · · · · · · · · · · ·					-
. '								· .
	SRT.D.	C 5				·		
•		C 5						
-	1:	C 5	SUBROUTIN					
-	1: 2:	C 5	DIMENSION	ISTM(10				
-	1: 2: 3:	C 5	DIMENSION DATA IST	I STM ( 10 1/0, 0, 0,	3, 4, 3, 4,	0,2,4,		4, 4, 0, 1, 1, 2
-	1: 2: 3: 4:	C 5	DIMENSION	I STM ( 10 1/0, 0, 0, 2, 1, 0,	3, 4, 3, 4, 1, 3, 2, Ø,	Øs 2s 4s 4s 4s 4s 4	4. Ø. 1. 1.	3 = Q = 1 = 3 = 3 = Q
•	1: 2: 3:	C 5	DIMENSION DATA IST	I STM ( 10 1/0, 0, 0, 2, 1, 0,	3, 4, 3, 4, 1, 3, 2, Ø,	Øs 2s 4s 4s 4s 4s 4	4. Ø. 1. 1.	
-	1: 2: 3: 4:	C 5	DIMENSION DATA IST *	I STM ( 10 1/0, 0, 0, 2, 1, 0, 3, 1, 2,	3, 4, 3, 4, 1, 3, 2, Ø, 4, 3, 2, 2,	©, 2, 4, 4, 4, 4, 4 3, 4, 0,	4 = Ø = 1 = 1 = . 1 = 3 = 0 = 3 = .	3 = Q = 1 = 3 = 3 = Q
-	1: 2: 3: 4: 5:	C 5	DIMENSION DATA IST *	ISTM(10 1/0,0,0,0, 2,1,0, 3,1,2, 2,0,1,	3, 4, 3, 4, 1, 3, 2, 0, 4, 3, 2, 2, 3, 2, 0, 1,	Ø, 2, 4, 4, 4, 4, 4 3, 4, 0, 4, 2, 2, 4	4, 0, 1, 1, 1, 1, 3, 0, 3, . 4, 3, 1, 0, 3	30 (20 10 30 30 (2 40 20 20 20 30 1
-	1: 2: 3: 4: 5: 6:	C 5	DIMENSION DATA IST * *	ISTM(10 1/0,0,0,0, 2,1,0, 3,1,2, 2,0,1, 2,2,4,	3, 4, 3, 4, 1, 3, 2, 0, 4, 3, 2, 2, 3, 2, 0, 1,	Ø, 2, 4, 4, 4, 4, 4 3, 4, 0, 4, 2, 2, 4	4, 0, 1, 1, 1, 1, 3, 0, 3, . 4, 3, 1, 0, 3	3, 0, 1, 3, 3, 0 4, 2, 2, 2, 3, 1 3, 0, 4, 2, 3, 0
-	1: 2: 3: 4: 5: 6: 7:	C 5	DIMENSION DATA IST * * *	I STM (10 1/0, 0, 0, 2, 1, 0, 3, 1, 2, 2, 0, 1, 2, 2, 4, 000)	3, 4, 3, 4, 1, 3, 2, 0, 4, 3, 2, 2, 3, 2, 0, 1, 1, 3, 4, 4,	0, 2, 4, 4, 4, 4, 4, 3, 4, 0, 4, 2, 2, 4 1, 2, 4,	4, 0, 1, 1, 1, 1, 3, 0, 3, . 4, 3, 1, 0, 3	3, 0, 1, 3, 3, 0 4, 2, 2, 2, 3, 1 3, 0, 4, 2, 3, 0
-	1: 2: 3: 4: 5: 6: 7: 8: 9:		DIMENSION DATA IST * * * WRITE(2, 1 FORMAT('E	I STM(10 1/0,0,0,0, 2,1,0, 3,1,2, 2,0,1, 2,2,4, 000) LOCK 4	3, 4, 3, 4, 1, 3, 2, 0, 4, 3, 2, 2, 3, 2, 0, 1, 1, 3, 4, 4, . READY ?	0, 2, 4, 4, 4, 4, 4, 3, 4, 0, 4, 2, 2, 4 1, 2, 4,	4, 0, 1, 1, 1, 1, 3, 0, 3, . 4, 3, 1, 0, 3	3, 0, 1, 3, 3, 0 4, 2, 2, 2, 3, 1 3, 0, 4, 2, 3, 0
•	1: 2: 3: 4: 5: 6: 7: 8: 9: 10:		DIMENSION DATA IST. * * * * WRITE(2, 1	I STM(10 1/0,0,0,0, 2,1,0, 3,1,2, 2,0,1, 2,2,4, 000) LOCK 4	3, 4, 3, 4, 1, 3, 2, 0, 4, 3, 2, 2, 3, 2, 0, 1, 1, 3, 4, 4, . READY ?	0, 2, 4, 4, 4, 4, 4, 3, 4, 0, 4, 2, 2, 4 1, 2, 4,	4, 0, 1, 1, 1, 1, 3, 0, 3, . 4, 3, 1, 0, 3	3, 0, 1, 3, 3, 0 4, 2, 2, 2, 3, 1 3, 0, 4, 2, 3, 0
-	1: 2: 3: 4: 5: 6: 7: 8: 9:		DIMENSION DATA IST. * * WRITE(2,1 FORMAT('B CALL BLKØ CALL FL4	I STM(10 1/0,0,0,0, 2,1,0, 3,1,2, 2,0,1, 2,2,4, 000) LOCK 4	3, 4, 3, 4, 1, 3, 2, 0, 4, 3, 2, 2, 3, 2, 0, 1, 1, 3, 4, 4, . READY ?	0, 2, 4, 4, 4, 4, 4, 3, 4, 0, 4, 2, 2, 4 1, 2, 4,	4, 0, 1, 1, 1, 1, 3, 0, 3, . 4, 3, 1, 0, 3	3, 0, 1, 3, 3, 0 4, 2, 2, 2, 3, 1 3, 0, 4, 2, 3, 0
•	1: 2: 3: 4: 5: 6: 7: 3: 9: 10: 11: 12:		DIMENSION DATA IST. * * WRITE(2,1 FORMAT('E CALL BLKØ CALL FL4 REWIND 8	I STM(10 1/0,0,0,0, 2,1,0, 3,1,2, 2,0,1, 2,2,4, 000) LOCK 4 D(I STM,X	3, 4, 3, 4, 1, 3, 2, 0, 4, 3, 2, 2, 3, 2, 0, 1, 1, 3, 4, 4, . READY ?	0, 2, 4, 4, 4, 4, 4, 3, 4, 0, 4, 2, 2, 4 1, 2, 4,	4, 0, 1, 1, 1, 1, 3, 0, 3, . 4, 3, 1, 0, 3	3, 0, 1, 3, 3, 0 4, 2, 2, 2, 3, 1 3, 0, 4, 2, 3, 0
•	1: 2: 3: 4: 5: 6: 7: 8: 9: 10: 11: 12: 13:		DIMENSION DATA IST. * * WRITE(2,1 FORMAT('B CALL BLKØ CALL BLKØ CALL FL4 REWIND 8 WRITE(8)I	I STM(10 1/0,0,0,0, 2,1,0, 3,1,2, 2,0,1, 2,2,4, 000) LOCK 4 D(I STM,X	3, 4, 3, 4, 1, 3, 2, 0, 4, 3, 2, 2, 3, 2, 0, 1, 1, 3, 4, 4, . READY ?	0, 2, 4, 4, 4, 4, 4, 3, 4, 0, 4, 2, 2, 4 1, 2, 4,	4, 0, 1, 1, 1, 1, 3, 0, 3, . 4, 3, 1, 0, 3	3, 0, 1, 3, 3, 0 4, 2, 2, 2, 3, 1 3, 0, 4, 2, 3, 0
-	1: 2: 3: 4: 5: 6: 7: 8: 9: 10: 11: 12: 13: 14:		DIMENSION DATA IST * * WRITE(2,1 FORMAT('E CALL ELKØ CALL ELKØ CALL FL4 REWIND 8 WRITE(3)I RETURN	I STM(10 1/0,0,0,0, 2,1,0, 3,1,2, 2,0,1, 2,2,4, 000) LOCK 4 D(I STM,X	3, 4, 3, 4, 1, 3, 2, 0, 4, 3, 2, 2, 3, 2, 0, 1, 1, 3, 4, 4, . READY ?	0, 2, 4, 4, 4, 4, 4, 3, 4, 0, 4, 2, 2, 4 1, 2, 4,	4, 0, 1, 1, 1, 1, 3, 0, 3, . 4, 3, 1, 0, 3	3, 0, 1, 3, 3, 0 4, 2, 2, 2, 3, 1 3, 0, 4, 2, 3, 0
•	1: 2: 3: 4: 5: 6: 7: 8: 9: 10: 11: 12: 13:		DIMENSION DATA IST. * * WRITE(2,1 FORMAT('B CALL BLKØ CALL BLKØ CALL FL4 REWIND 8 WRITE(8)I	I STM(10 1/0,0,0,0, 2,1,0, 3,1,2, 2,0,1, 2,2,4, 000) LOCK 4 D(I STM,X	3, 4, 3, 4, 1, 3, 2, 0, 4, 3, 2, 2, 3, 2, 0, 1, 1, 3, 4, 4, . READY ?	0, 2, 4, 4, 4, 4, 4, 3, 4, 0, 4, 2, 2, 4 1, 2, 4,	4, 0, 1, 1, 1, 1, 3, 0, 3, . 4, 3, 1, 0, 3	3, 0, 1, 3, 3, 0 4, 2, 2, 2, 3, 1 3, 0, 4, 2, 3, 0

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	SRT.D.C 6	
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·	1:	SUBROUTINE BLK5D
	2:	DIMENSION ISTACICO, XRT(100)
-	3:	DATA ISTM/3,4,1,0,3,1,0,0,2,2,0,1,4,2,0,0,1,4,2,0
	-	* 3, 4, 1, 0, 3, 2, 3, 3, 0, 0, 1, 3, 4, 2, 1, 2, 4, 0, 4, 0,
	4:	* 4, 3, 0, 3, 3, 4, 0, 4, 1, 3, 3, 2, 3, 2, 1, 1, 1, 0, 2, 2,
	5:	
	6:	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
	7:	
	8:	WRITE(2, 1000)
	9: 1000	FOFMAT('ELOCK 5 READY ?')
	10:	CALL ELKOD(ISTM, XPT)
	11:	CALL FL5
: 1. J	12:	FEWIND 8
	13:	WRITE(8)ISTM, XRT
	14:	RETURN
	15:	END
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	SRT • D • C 7	·
•		
	1:	SUBROUTINE BLK6C
	2:	DIMENSION ISTM(100), XRT(100)
•	3:	DATA ISTM/4, 1, 3, 4, 1, 1, 4, 4, 1, 2, 2, 0, 2, 1, 2, 1, 0, 4, 4, 0,
	4:	* 1, 4, 0, 4, 1, 2, 3, 2, 1, 0, 2, 2, 3, 1, 0, 4, 0, 4, 3, 3,
	5:	* 4, 1, 0, 4, 0, 3, 2, 1, 3, 1, 1, 3, 0, 0, 4, 3, 1, 3, 2, 2,
	6:	* Ø, 3, 1, 2, 3, 3, 0, 3, 4, 2, 2, 1, 4, 2, 4, 3, 4, 3, 1,
	7:	* 0, 0, 1, 2, 0, 0, 2, 0, 1, 2, 3, 1, 3, 4, 0, 2, 4, 4, 0, 2/
	8:	WRI TE(2, 1000)
	9: 1000	FORMAT('BLOCK 6FEADY ?')
	.10:	
	-	CALL BLK(C(ISTM, XRT)
	11:	CALL FL6
	12:	REWIND 8
	13:	WRITE(8)ISTM, XRT
	14:	RETURN
-	15:	EN D
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5: 6: 7: 8: 9: 1000 10: 11: 12:	* 3, 3, 3, 3, 2, 4, 3, 4, 0, 2, 1, 2, 1, 6, 4, 3, 2, 4, 1, * 6, 1, 1, 2, 3, 4, 1, 4, 3, 2, 1, 2, 1, 6, 4, 3, 2, 4, 1, * 2, 0, 0, 3, 3, 1, 3, 1, 6, 1, 4, 0, 0, 1, 2, 4, 3, 0, 4, 4, * 2, 4, 1, 3, 2, 3, 2, 2, 1, 4, 0, 4, 0, 4, 2, 2, 4, 3, 6, 4/ * 2, 4, 1, 3, 2, 3, 2, 2, 1, 4, 0, 4, 0, 4, 2, 2, 4, 3, 6, 4/ * WRITE(2, 1000) FOPMAT('BLOCK 7 READY ?') CALL BLK 0C(ISTM, XRT) CALL FL7 REWIND 8 WRITE(8) ISTM, XRT
13:	WRITE(8)ISHDXAT
14:	RETUEN
15:	END

SRT.D.C 9

SUBROUTINE BLX8C 1: 2: DIMENSION ISTM(100), XRT(100) 3: DATA ISTM/2, 4, 2, 4, 2, 1, 1, 2, 4, 4, 2, 2, 1, 0, 2, 0, 1, 3, 3, 0, 4: 4, 0, 3, 2, 4, 2, 2, 3, 4, 1, 4, 1, 1, 0, 1, 3, 1, 3, 0, 1, . 5: 2, 3, 2, 1, 4, 0, 2, 1, 3, 3, 1, 2, 4, 4, 1, 2, 4, 0, 4, 1, 0, 4, 4, 1, 3, 4, 0, 1, 3, 0, 0, 3, 0, 0, 3, 0, 2, 4, 3, 1, 6: \* 7: 2, 3, 0, 2, 1, 0, 2, 2, 0, 3, 4, 3, 1, 4, 3, 4, 0, 0, 3, 3/ ÷ WRITE(2,1000) 8: FORMAT( 'BLOCK 8 ... READY ?') 9: 1000 10: CALL BLK@C(ISTM, XRT) CALL FL8 11: 12: REWIND 8 13: WRITE(8) ISTM, XRT 14: RETURN 15: EN D

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RT.D.C 1	~										
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			•								
1:	SUBROUTI	NE BLK90		r(100)	•						
2:	DIMENSIC	N ISTM(10	1 4 2	1. 1. 1	. 1. 1.	3.4	. 0. 0	و ا ا	3,4	, 2,	2,
3:	DATA 15	5121/ 12 32 22	1,4,3 , a a	1 1.3	3.1.	1.0	. 3. 1	. 0.	0,4	, Ø,	е,
4:	*	3 2 2 2	4,0,0	<i>1 1 1 1 1 1 1 1 1 1</i>	. 9. /	. Ø. 2	. 1. 2	. 3.	2,0	11	1,
5:	*	2, 3, 2,	3,0,2.	0 0 0	0 0	1.1	. / /	1. 1.	0.3	, 2,	2,
6:	*	دا د3 دا	2 1 2 2	, 2, 0, 4	19 19 19 19 19 19 19 19	a. 2	. 3. 5	), <u>,</u>	4.3	. 4.	2/
7:	*		3, 1, 3,	4 و1 و3 و ·							
8:	WRITE(2.	, 1000)		r <u>01</u>							
9: 100	10 FORMAT(	ELOCK 9.	READ	Y Y Y							
10:			(RI)								
11:			-								
12:											
13:	WRITE(8	) I STM, XRT					•				
14:	RETURN							•			
15:	EN D		· · ·								
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SRT.D.C 1	1		1. S. 1								
	•										
1:	SUBROUT	NE ELKA	5								
2:				T(100)							
3:			-			2.0	. 3. 0	6.2.	0,2	. 1.	3,
- ·	*										
	*										
6:	*		2,0,2		-						
7:	*		2, 1, 3,								
•	WRITE(2)		10 11 10						2 10		
8.			REA	DY ?!)				,			
8:	A FORMATC	ישנייטייייי	· · · · · · · · · · · · · · ·	/							
9: 100	-		(PT)								
9: 100 10:	CALL BLA	(ØC(ISTM))	(RT)								
9: 100 10: 11:	CALL BLA Call FLA	(ØC(ISTM)) A	(RT)								
9: 100 10: 11: 12:	CALL BLY CALL FLA REWIND 8	(0C(ISTM)) A B		•							
9: 100 10: 11: 12: 13:	CALL BLA CALL FLA REWIND 8 WRITE(8)	(ØC(ISTM)) A		•	•	·					
9: 100 10: 11: 12:	CALL BLY CALL FLA REWIND 8	(0C(ISTM)) A B		•	• •		•				
	4: 5: 6: 7: 8: 9: 100 10: 11: 12: 13: 14: 15: 5RT-D-C 1 1:	4: * 5: * 6: * 7: * 8: WRITE(2, 9: 1000 FORMAT( 10: CALL ELI 11: CALL FLO 12: REWIND & 13: WRITE(8) 14: RETURN 15: END 5: END 5: END 5: DIMENSION 3: DATA IS 4: *	4:       *       3, 0, 2,         5:       *       2, 3, 2,         6:       *       1, 3, 1,         7:       *       2, 3, 0,         8:       WHITE(2, 1000)         9:       1000       FORMAT('ELOCK 9,         10:       CALL ELK0C(ISTM, 2)         11:       CALL FL9         12:       REWIND 8         13:       WRITE(8) ISTM, XRT         14:       RETURN         15:       END         SERT. D. C       11         1:       SUBROUTINE ELKAC         2:       DIMENSION ISTM(1)         3:       DATA ISTM/3, 1, 4,         4:       *       0, 0, 3,	4:       *       3, Ø, 2, 4, Ø, Ø,         5:       *       2, 3, 2, 3, 0, 2.         6:       *       1, 3, 1, 1, 1, 2.         7:       *       2, 3, 0, 3, 1, 3.         8:       WRITE(2, 1000)         9:       1000         9:       1000         9:       1000         9:       1000         9:       1000         9:       1000         9:       1000         9:       1000         10:       CALL ELKØC(ISTM,XRT)         11:       CALL FL9         12:       REWIND 3         13:       WRITE(8) ISTM,XRT         14:       RETURN         15:       END         15:       END         16:       SUBROUTINE ELKAC         17:       DIMENSION ISTM(100),XR         18:       DIMENSION ISTM(100),XR         19:       DATA ISTM/3, 1,4,2,3,4         4:       *	4:       *       3, Ø, 2, 4, Ø, Ø, 1, 1, 3         5:       *       2, 3, 2, 3, 0, 2, 4, 4, 2         6:       *       1, 3, 1, 1, 1, 2, 2, 0, 4         7:       *       2, 3, Ø, 3, 1, 3, 3, 1, 4         8:       WRITE(2, 1000)         9:       1000         9:       1000         9:       1000         9:       1000         9:       1000         9:       1000         9:       1000         9:       1000         10:       CALL ELK0C(ISTM, XET)         11:       CALL FL9         12:       REWIND 8         13:       WRITE(8) ISTM, XET         14:       RETUEN         15:       END         15:       END         5:       DIMENSION ISTM(100), XET(100)         3:       DATA ISTM/3, 1, 4, 2, 3, 4, 4, 4, 4         4:       *	4:       *       3, 0, 2, 4, 0, 0, 1, 1, 3, 3, 4, 4, 5;         5:       *       2, 3, 2, 3, 0, 2, 4, 4, 2, 2, 4, 4, 4, 2, 2, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4,	4:       *       3, 0, 2, 4, 0, 0, 1, 1, 3, 3, 4, 4, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	3. @, 2. 4, @, 0, 1, 1, 3. 3. 4, 4, @, 3, 1         4: *       2. 3. 2. 3. 0, 2. 4, 4. 2. 2. 4. 0, 2. 1, 2         5: *       1. 3. 1, 1, 1. 2. 2. 0, 4, 0, 0, 1, 1. 4. 4         7: *       2. 3. 0, 3. 1, 3. 3, 1, 4. 1, 0, 0, 2. 3. 2         6: *       1. 3. 1, 1, 1. 2. 2. 0, 4. 0, 0, 0, 1. 1. 4. 4         7: *       2. 3. 0, 3. 1, 3. 3, 1, 4. 1, 0, 0, 2. 3. 2         7: *       2. 3. 0, 3. 1, 3. 3, 1, 4. 1, 0, 0, 2. 3. 2         8: WRITE(2. 1000)       9: 1000 FORMAT('ELOCK 9READY ?')         10: CALL ELK0C(ISTM.XRT)         11: CALL FL9         12: REWIND 3         13: WRITE(3) ISTM.XRT         14: RETURN         15: END         5: END         5: END         5: END         5: DIMENUTINE ELKAC         2: DIMENSION ISTM(100).XRT(100)         3: DATA ISTM/3. 1, 4. 2. 3. 4. 4. 1. 0. 0. 2. 0. 0. 3. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	3, 0, 2, 4, 0, 0, 1, 1, 3, 3, 4, 4, 0, 3, 1, 0, 5;         *       2, 3, 2, 3, 0, 2, 4, 4, 2, 2, 4, 0, 2, 1, 2, 3, 6;         5:       *       1, 3, 1, 1, 1, 2, 2, 0, 4, 0, 0, 1, 1, 4, 4, 1, 1, 1, 3, 1, 4, 1, 2, 2, 0, 4, 0, 0, 0, 1, 1, 4, 4, 1, 1, 1, 2, 2, 0, 4, 0, 0, 0, 2, 3, 2, 3, 1;         6:       *       2, 3, 0, 3, 1, 3, 3, 1, 4, 1, 0, 0, 2, 3, 2, 3, 1;         7:       *       2, 3, 0, 3, 1, 4, 1, 0, 0, 0, 2, 3, 2, 3, 1;         8:       WHITE(2, 1000)         9:       1600         9:       1600         9:       1600         9:       1600         9:       1600         9:       1600         9:       1600         9:       1600         11:       CALL FL9         12:       REMIND 8         13:       WRITE(8) ISTM, XRT         14:       RETURN         15:       END         15:       END         16:       SUBROUTINE         17:       SUBROUTINE         18:       SUBROUTINE         19:       DIMENSION ISTM(100), XRT(100)         3:       DATA         10:       SUBROUTINE         2:       DATA         2:       Subroutine	<pre>3, @, 2, 4, Ø, Ø, 0, 1, 1, 3, 3, 4, 4, 0, 3, 1, 0, Ø, 4, 5: * 2, 3, 2, 3, 0, 2, 4, 4, 2, 2, 4, 0, 2, 1, 2, 3, 2, 0 6: * 1, 3, 1, 1, 1, 2, 2, 0, 4, 0, 0, 1, 1, 4, 4, 1, 0, 3 7: * 2, 3, 0, 3, 1, 3, 3, 1, 4, 1, 0, 0, 2, 3, 2, 3, 4, 3 8: WRITE(2, 1000) 9: 1000 FORMAT('ELOCK 9READY ?') 10: CALL ELK 0C(ISTM, XRT) 11: CALL FL9 - 12: REWIND 3 13: WRITE(8) ISTM, XRT 14: RETURN 15: END 15: END 16: SUBROUTINE ELKAC 2: DIMENSION ISTM(100), XRT(100) 3: DATA ISTM/3, 1, 4, 2, 3, 4, 4, 1, 0, 0, 2, 2, 4, 2, 3, 0, 0, 3</pre>	<pre>3, 0, 2, 4, 0, 0, 1, 1, 3, 3, 4, 4, 0, 3, 1, 0, 0, 4, 0, 5, 1, 5, 0, 4, 0, 5, 1, 5, 2, 3, 2, 0, 1, 1, 3, 1, 1, 1, 2, 2, 0, 4, 0, 0, 2, 1, 1, 4, 4, 1, 0, 3, 2, 2, 3, 0, 3, 1, 3, 3, 1, 4, 1, 0, 0, 2, 3, 2, 3, 4, 3, 4, 5; WEITE(2, 1000) 9: 1000 FOEMAT('ELOCK 9READY ?') 10: CALL FL9 12: REWIND 8 13: WRITE(8) ISTM, XRT 14: RETUEN 15: END 55: ENT 55: END 55: ENT 55: EN</pre>

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SRT. D. C	C 12	· · · ·
1: 2:	C .	SUBROUTINE ELK@C(ISTM, XRT)
3:	C	DIMENSION ISTM(100), XRT(100)
. 5:		READ(1, 1001)A FOPMAT(A4)
7:	100	CALL INP40(IRES)
· 8: 9:		IF(IRES.EQ.0)GO TO 100 CALL INTLTM
10: 11:	101	CALL TMR(I10MS,ISEC) IF(I10MS.LT.50)G0 TO 101
12:	102	CALL OUT40(128) CALL INP41(IRES)
14:	100	IF(IRES.EQ.0)GO TO 102
15: 16:		CALL OUT40(0) DO 110 I 1=1,2
17:	111	CALL INTLIM CALL IMR(I10MS,ISEC)
19: 20:		IF(ISEC.LT.2)G0 TO 111 CALL OUT40(128)
21: 22:	112	CALL INP41(IRES) IF(IRES.EQ.C)GO TO 112
23:	110	CALL OUT40(0) CONTINUE
25:		DO 200 I2=1,100
26: 27:		CALL INTLTM I2I=ISTM(I2)
28: 29:	201	ITI=100 IF(I21.EQ.0)GO TO 211
30: 31:		I TI=IFIX(FLOAT(ITI)*1.3) I21=I21-1
32:	211	GO TO 201 CALL TMR(I10MS,ISEC)
34:		IF(I1@MS.LT.III)GO TO 211 CALL OUT40(128)
35: 36:		CALL INTLTM
37: 38:	212	CALL INP41(IFES) CALL TMR(I10MS,ISEC)
39: 40:		IF(IRES.EQ.0)GO TO 212 CALL OUT40(0)
41: 42:		XET(I2)=FLOAT(I10MS)/100.0 CONTINUE
43:		CALL OWARI RETUEN
44: 45:		EN D

SRT.D.(	5 13	
1:	С	SUEFOUTINE BLK@D(ISTM,XRT)
3:	c	DIMENSION ISTM(100), XRT(100)
5:	C	READ(1, 1001)A
6:	1001	FORMAT(A4)
7:		D0 110 I 1=1.2
8:		CALL BUZZER
9:		CALL INTLIM
10:	111	CALL TMR(I10MS, ISEC)
11:		IF(ISEC.LT.2)GO TO 111
12:		CALL OUT40(128)
13:	112	CALL INF41(IRES)
14:		IF(IRES-EQ.C)GO TO 112
15:		CALL OUT40(0)
16:	110	CONTINUE
17:		DO 200 I2=1.100
18:		CALL BUZZER
19 :		CALL INTLIM
20:		121=1STM(12)
21:		ITI = 100
	201	IF(I21.EQ.0)GO TO 211
23:		ITI=IFIX(FLOAT(ITI)*1.3)
24:		121=121-1
25:	011	GO TO 201 CALL TMR(I10MS,ISEC)
26: 27:	211	IF(I10MS.LT.ITI)GO TO 214
27: 28:		CALL OUT40(128)
20: 29:		CALL INTLIM
30:	212	CALL INP41(IRES)
31:		CALL TMR(I 10MS, I SEC)
32:		IF(IRES.EQ.0)GO TO 212
33:		CALL OUT40(0)
34:		XRT(12)=FLOAT(110MS)/100.0
35:	200	CONTINUE
36:		CALL OWARI
37:		RETURN
38:		EN D

SRT.D.C 14

1:		SUBROUTINE BUZZER
2:		CALL INTLIM
3:	300	CALL TMR(110MS, ISEC)
4:		CALL INP40(IRES)
5;:		IF(IRES.NE.0)GO TO 400
6:		IF(110MS.LT.50)GO TO 300
7:		CALL INTLIM
8:		CALL OUT41(128)
9:	100	CALL TMR(II0MS, ISEC)
10:		CALL INP40(IRES)
11:		IF(IRES-NE-0)GO TO 400
12:		IF(I10MS.LT.20)GO TO 100
13:	420	CALL OUT41(Ø)
14:		CALL INTLIM
15:	500	CALL TMR(II@MS,ISEC)
16:		CALL INP40(IRES)
17:		IF(IRES.NE.0)GO TO 400
18:	2	IF(110MS.LT.10)GO TO 500
19:	200	CALL INP40(IRES)
20:		IF(IRES.EQ.0)GO TO 200
21:		RETURN
22:	C	
23:	400	CALL INP40(IRES)
24:		CALL OUT41(128)
25:		IF(IRES.NE.0)GO TO 400
26:	•	CALL INTLIM
27:	410	CALL TMR(I10MS, ISEC)
28:		IF(ISEC.LT.5)GO TO 410
29:		GO TO 420
30:	С	
31:		EN D

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		- 170 -	•
	SRT.D.C 15		
•	1: 2: C	SUBROUTINE DTANL 1	
• •	3: 4: C	DIMENSION ISTM(100), XET(100)	
	5:	CALL FLI FEWIND 8	
	7: 8:	READ(8) I STM, XRT WRI TE(6, 1000)	
	9: 1000 10: * 11:	FOFMAT(1H1,10X,'DATA OF BLOCK 1'/// 1X,5('ITI RT(SEC) '),//) CALL DTANL0(ISTM,XRT)	· .
•	12:	RETURN EN D	
	· · · · · · · · · · · · · · · · · · ·		
÷.,	SRT.D.C 16		
-	1:	SUBFOUTINE DTANL 2	· _
-	2: C 3:	DIMENSION ISTM(100), XRT(100)	
•	4: C 5:	CALL FL2	
	6: 7: 8:	REWIND 8 READ(8)ISTM,XRT WRITE(6, 1000)	
	9: 1000	FOFMAT(1H1,10X,'DATA OF BLOCK 2'/// * IX,5('ITI RT(SEC) '),//)	
	11: 12:	CALL DTANLØ(ISTM,XRT) RETURN	
	13:	END	÷
	<u></u>		
			· · .
	SRT. D. C 17		
-	1:	SUBROUTINE DTANL 3	
-	2: C 3:	DIMENSION ISTM(100), XRT(100)	
	4: C 5: 6:	CALL FL3	
	7:	REWIND 8 READ(8)ISTM,XRT WRITE(6, 1000)	
	9: 1000 10:	FORMAT(1H1,10X,'DATA OF ELOCK 3'/// * 1X,5('ITI RT(SEC) '),//)	
	11: 12: 13:	CALL DTANL@(ISTM,XRT) RETURN END	
	10:		

	*	
•	SRT D.C 13	
	1:	SUEROUTINE DTANL 4
	a 2: C 3: -	DIMENSION ISTM(100),XRT(100)
	4: C 5:	CALL FL4
	6: 7:	REWIND 8 READ(8)ISTM, XRT
	8: 9: 1000	WRITE(6, 1000) FOFMAT(1H1, 10X, 'DATA OF ELOCK 4'///
	10:	<pre>* 1X,5('ITI RT(SEC) '),//) CALL DTANL@(ISTM,XRT)</pre>
	12:	R E T U FN EN D

SRT . D. C 19 1: SUBROUTINE DTANL 5 2: C DIMENSION ISTA(100), XET(100) 3: 4: C 5: CALL FL5 REWIND 8 6: 7: PEAD(8)ISTM.XRT 8: WRITE(6, 1000) 9: 1000 FORMAT(1H1, 10X, 'DATA OF BLOCK 5'/// \* 1X, 5('ITI RT(SEC) '),//) 10: CALL DTANLØ(ISTM,XRT) 11: 12: FETURN EN D 13:

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SRT.D.C 20

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1:	_	SUBROUTINE DTANL6
2: 3:	C	DIMENSION ISTM(100), XRT(100)
4:	С	
5:		CALL FL6
6:		REVIND 8
7:		READ(8) I STM, XRT
8:	1 A.	WRITE(6, 1000)
9:	1000	FOFMAT(1H1, 10X, 'DATA OF BLOCK 6'///
Ø:		* 1X,5('ITI RT(SEC) '),//)
1:	•	CALL DTANLO(ISTM,XET)
2:		RETUEN
3:		EN D

			,	
	SRT.D.(	21		
-				
	1:	~	SUBROUTINE DTANL 7	
-	2:	C	DIMENSION ISTM(100), XRT(100)	
	4:	С	DIMENSION ISHN IDD//MAILIEU/	
•	5:	-	CALL FL7	
	6:		REWIND 8	
	7:		READ(8) I STM, XRT	
	8:	1000	WRITE(6,1000) FORMAT(1H1,1CX,'DATA OF BLOCK 7'///	
•	10:		* 1X, 5('ITI RT(SEC) '),//)	
	11:		CALL DTANL @(ISTM, XRT)	
	12:		RETUEN	
	13:		EN D	•
		······································		
1			and a second	•••••••••••••••••••••••••••••••••••••••
		•		
÷	SRT.D.	c 00		
E	Shi • D•	0 22		
-	1:		SUBROUTINE DTANL8	
-	2:			
	3:		DIMENSION ISTM(100), XET(100)	
	4: 5:		CALL FL8	
	6:		REWIND 8	
1	7:		READ(8) I STM, XRT	
1	8:		WRITE(6, 1000)	•
		1000		·
	10:		<pre>* IX,5('ITI RT(SEC) '),//) CALL DTANL@(ISTM,XRT)</pre>	•
	12:		RETURN	
	13:		END	
ł				
·		51.1		·
			e e 19 - Mary yn 19 fe ffeddae fan 👝 e dynamonae affit yn enwenen fy genedae an ar gynyn yn annae ar yn yn yn yn yn fefdd yn gynyn yn ferddae yn	
· · .				
	CDT D	c 03		
	SRT.D.	C 23		
	1:		SUBROUTINE DTANL9	
-		C ·		
	3:		DIMENSION ISTM(100), XRT(100)	
	4: 5:	С	CALL FL9	
	6:		REWIND 8	
	7:		READ(8) I STM, XRT	
	8:		WRITE(6, 1000)	
1	9:		FORMAT(1H1, 10X, 'DATA OF ELOCK 9'/// * 1X,5('ITI ET(SFC) '),//)	
	10:		<pre>* 1X,5('ITI RT(SEC) '),//) CALL DTANLØ(ISTM,XRT)</pre>	•
the second	12:		RETURN	
	13:		END	

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•

SRT. D. C 24 r SUBROUTINE DTANLA 1: 2: C DIMENSION ISTM(100),XRT(100) 3: 4: C 5: CALL FLA REWIND 8 6: 7: READ(8) I STM, XET WRITE(6, 1000) 8: 9: 1000 FORMAT(1H1, 10X, 'DATA OF BLOCK 10'/// 10: \* 1X, 5('ITI RT(SEC) '),//) CALL DTANLØ(ISTM,XRT) 11: 12: RETURN 13: . EN D

SR	T.D.C	25					•	
	1: 2: C		SUBRUCTINE	DTANL Ø(IS	IM, XRT)			
	3:		DIMENSION	ISTM(100),	XET(100).	XITI(5), X1	RI (5.5.	(0).
	4:	•	*	JTBL (5, 5),				
	5: C		4	0121(0) 0/9	A SHICE/FA	Ani ( U/		
	6:		DO 100 I 1=	1,20				
•	7:		DO 110 I11=					
	8:		J1=(I1-1)*		•			
· •	9:		XXRT(111)=>			- ,		
	10:		KSTM=100		•			
	11:		KSTP=ISTM(	J 1)				
	12: 1	12	IF(KSTP.EQ.	Ø) GO TO 11	1			
	13:		KSTM=IFIX()	FLOAT(KSTM)	*1.3)			
	14:		KSTP=KSTP-	1 .				
	15:		GO TO 112					
	16: 1	11	XSTM(I11) = I	FLOAT(KSTM)	/100.0			
	17: 1	10	CONTINUE					
	18:		WRITE(6,11)	20)(XSTM(J1	),XXRT(J1	), J 1= 1, 5)		
	19: 1	100	FORMATCIX,	5(F5•2•F6•2	• 3X))			
	20: 1		CONTINUE			•.		
	21: C							
	22: C							
	23:		DO 200 I2=					
	24:		DO 201 I21=					
	25:		DO 202 I22=					
	26:	a 0	XTEL (12,12)	1,122)=9999	9.9	•		
	27: 2	02	CONTINUE	$() - \alpha$				
	28: 29: 2	aı	JTBL(12,12) CONTINUE	0 = 0				
	30: 2		CONTINUE					
	31:		K2=1 STM(1)+	• 1		*		
	32:		DO 210 I2=2				•	
	33:		К1=К2					
	34:		K2=ISTM(I2)	+ 1				
	35:		JTEL(K1,K2)	JTEL (KI)K	2)+1			•
	36:		K3=JTBL(K1,	K2)				· ·
	37:		XTBL (KI.K2,	K3)=XRT(I2	)			
	38: 2	10	CONTINUE					
	39:		XI TI = 100					
	40:		DO 300 13=1	l 5				
	41:		XITI(I3) = FL	.0AT(KITI)/	100.0			
	42:		KITI=IFIX(F	LOAT(KITI)	*1.3)			
	43: 31	ØØ	CONTINUE					
	44:		WRITE(6,200					
	45: 21	660	FORMATCIH1,		GENCY TABL	LES')		
	46:		LO 400 I 4= 1					•
	47:	100	WEITE(6,210					•
	48: 2							
	49: 50:			CONTINGEN 5(F5.2, S		LUUS FP S	• //	
	50:		WRITE(6,220			)	.182=1.1	@)
	52: 22		FORMAT(10(1				, UN C- 17 1	
		00	CONTINUE					

SRT. D. C 25

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n 1	54: C 55: C 56: 57:	F E T U RN EN D

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## APPENDIX E

The program for calculating the values in

Figures 6 and 7.

		1		- 177 -
		L 00010	e -	
•		00010		MAIN PROGRAMM
c	:	00020	-	
		00040		WRITE(6,1000)
		00050		
	r.	00060		READ(5,1010)XMINT
		00070		FORMAT(F7.2)
		00080		WRITE(6,1020)
		00090	1020	FORMAT(1X,'MAX T =')
4		00100		
		00110		WRITE(6,1030)
				FORMAT(1X,'ROU =')
÷.		00130		READ(5,1010)ROU
		00140		WRITE(6,1040)
. •				FORMAT(1X,'LAMDA =') READ(5,1010)XLAMD
14		00160 00170		WRITE(6,1050)
				FORMAT(1X,'DELTA =')
		00100	1000	READ(5,1010)DELT
· •		00200		
		00200	1070	FORMAT(1X,'MEAN RT IN THE NOT READY STATE =')
C	• • .	00220		READ(5,1010)RTNR
l l		00230		WRITE(6,1080)
		00240		FORMAT(1X,'MEAN RT IN THE READY STATE =')
(	· ·	00250		READ(5,1010)RTR
		00260		WRITE(6,3000)
				FORMAT(1X,'BACKGROUND WEIGHT =')
· · ·		00280		READ(5,1010)WB
		00290	7010	WRITE(6,3010) FORMAT(1X,'PREV. ST. WEIGHT =')
				READ(5,1010)WPR
1 5	· ·	00310 00320		WRITE(6,3020)
		00330		
0	- · ·	00340		READ(5,1010)TB
		00350		WRITE(6,2030)
		00360		the second se
C	)	00370		READ(5,1010)TPR
		99389	•	
		00390		FORMAT(A4)
C	)	00400		
•	$\bigcirc$	00410	С	NOTTERS COOCHUMINT UNDER DOLL VLOMD DELT DIND DID
1	Ų.	00420		WRITE(6,2000)XMINT,XMAXT,ROU,XLAMD,DELT,RTNR,RTR, * WB,WPR,TB,TPR
1.0	)	00430	2000	* WB,WPR,TB,TPR FORMAT(5X,'MINIMUM VALUE OF T =',F7.2//
		00440	2666	* 5X,'MAXIMUM VALUE OF T =',F7.2//
c	۰. ۱	00460		* 5%,'ROU =',F7.2//
	<i>.</i> ,	00470		* 5%,'LAMDA =',F7.2//
		00480	. '	* 5%,'DELTA =',F7.2//
	)	00490		* 5%,'MEAN RT IN THE NOT READY STATE =',F7.2//
		00500		* _ 5X,'MEAN RT IN THE READY STATE =',F7.2//
		00510		* 5X,'WEIGHT OF BACKGROUND =',F7.2//
	)	00520		* 5X, 'WEIGHT OF THE PREVIUOS STIMULUS =', F7.2//
	•	00530		* 5X,'BACKGROUND SET UP TIME =',F7.2//
		00540		* 5X,'PREVIUOS T =',F7,2//)
	).	00550		*****
		00560 00570		ትትትትትትትትትት VELI NUVIFIED የማግግሥትበት
10	~	00580	U,	TØ=(WB*TB+WPR*TPR)/(WB+WPR)
	)	00590	•	DELT=DELT*TØ
	4	00500		WRITE(6,4000)DELT
	)	00610		FORMAT(5X,'MODIFIED DELTA = ',G12.5//
ł	•	00620		* //5X,'T =',17X,'P =',17X,'MEAN RT ='/)
1	٠.	00630		T=XMINT
: C	)	00640	200	IF(T.GT.XMAXT)GO TO 100
		00650		XP=P(T-T0,ROU,XLAMD,DELT)

MAGEN	RT=XP*RTR+(1.0-XP)	*RTNR	
00670			
00680 2010	FORMAT(5X,612.5,8X	,G12.5,8X,G12.	5)
00690	T=T+0.1		
00700	GO TO 200		
00710 C			
00720 C			
		L END')	•
	ENU		
			•
	****	SUBBOLITINE	****
		and the first of the first of the first	
	FUNCTION P(T.ROU.X	LAMD, DELT)	· · · · ·
	DT=0.0		
00850 300			· · ·
00860	P=P+G(T-DT,ROU,XLA	MD)*H(DT,DELT)	*0.0001
00870	DT=DT+0.0001		
00880	GO TO 300		
00890 C			
	RETURN		
	END		
		CHOROLITTUE .	A state to be be to be be be be to be be dealer
	545 545 545 545 545 545 545 545 545 545	SUDRUUTINE	*****
	EUNCTION HAT DELTY		
		100	•
		1212121	
		· .	
01020 100	H=0.0		
01030	RETURN		
01040 C			
01050 200	H=1.0/DELT		· · · · · · · · · · · · · · · · · · ·
	RETURN	,	
	END		· ·
		•	
	to to the first state dealer in the large	CHERONITINE	****
	and the standard stream and the stream and	DODKOUTINE	·I····································
	FUNCTION G(T.ROU.V	IOMPY	
			· · · ·
01170	RETURN		
01180 C			
01190 100	G=1.0		
	DETUDN		
01200	REIURN		
01210 C			
01210 C 01220 200	G=(ROU+XLAMD-T)/XL	AMD	
01210 C 01220 200 01230		AMD	
01210 C 01220 200 01230 01240 C	G=(ROU+XLAMD-T)/XL RETURN	AMD	
01210 C 01220 200 01230 01240 C 01250	G=(ROU+XLAMD-T)/XL RETURN END	AMD	
01210 C 01220 200 01230 01240 C 01250 KEQ52500I	G=(ROU+XLAMD-T)/XL RETURN	AMD	
01210 C 01220 200 01230 01240 C 01250	G=(ROU+XLAMD-T)/XL RETURN END	AMD	
01210 C 01220 200 01230 01240 C 01250 KEQ52500I	G=(ROU+XLAMD-T)/XL RETURN END	AMD	
01210 C 01220 200 01230 01240 C 01250 KEQ52500I	G=(ROU+XLAMD-T)/XL RETURN END	AMD	
	00680       2010         00700       00710         00710       C         00720       C         00730       100         00740       2020         00740       2020         00750       C         00760       C         00760       C         00770       C         00780       C         00870       C         00830       C         00840       C         00850       300         00880       C         00890       C         00910       C         00920       C         00940       C         00950       C         00950       C         00950       C         01000       C         01010       C         01020       C         01030       C         01040       C         010	00670         WRITE(6,2010)T,XP,           00680         2010         FORMAT(5X,612.5,8X)           00690         T=T+0.1           00700         GO TO 200           00710         C           00720         C           00740         2020           00740         2020           00740         2020           00770         C           00820         FUNCTION P(T,ROU,X           00820         P=0.0           00830         DT=0.0           00850         300           00820         C           00820         C           00940         END           00950         C           00940         ##########           00950         FUNCTION H(T,DELT)           00950         FUNCTION H(T,DELT)           00950         FUNCTION H(T,DELT)           00950	00670         WRITE(6,2010)T,XP,RT           00680         2010         FORMAT(5X,612.5,8X,612.5,8X,612.           00690         T=T+0.1           00700         GO TO 200           00710         GO TO 200           00720         GO TO 200           00720         GO TO 200           00720         GO TO 200           00770         GO TO 200           00770         STOP           00770         END           00770         STOP           00770         END           00770         END           00770         GO           00770         END           00770         END           00770         END           00770         GO           00770         END           00770         GO           00770         GO           00770         END           00770         GO           00770         GO           00770         GO           00770         GO           00820         C           00820         GO           00920         RETURN           00920         FVNCTION

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