from the Portuguese published by Springer-Verlag, one would be inclined to expect a reasonably up-to-date account on the subject of thin shells of revolution, but the reader will be disappointed. Although the author expresses hope that the book "represents a contribution to the development of the theory of shells," it represents, in the reviewer's opinion, essentially the state of the art prior to 1930.

The book abounds in worked-out examples that reveal the author's intelligent use of arithmetic, with relatively little motivation for mathematical techniques and lack of adequate discussion of physical aspects.

Fourier Series

Fourier Series. By Georgi P. Tolstov. Prentice-Hall, Inc., Englewood Cliffs, N. J., 1962. Cloth, 6½ × 9½ in. $9.75 (for text for classroom); $13 (trade edition).

REVIEWED BY G. F. NEWELL[3]

THIS is a welcome addition to the growing list of translations from Russian books that bridge the gap between pure and applied mathematics. The level of the present book corresponds to an advanced undergraduate mathematics course in typical American universities. The only prerequisite is a good foundation in calculus preferably containing some advanced calculus. About half of the book is devoted to a detailed study of trigonometric series including Cesaro and Abel summability, and mean convergence for both single and multiple series. Integrals are always in the Riemann sense and functions are always piecewise smooth. Orthogonality properties are emphasized, extended to the Fourier-Bessel expansions and finally to more general Sturm-Liouville systems. The book ends with a discussion of the application to the solution of partial differential equations.

Throughout the book examples are discussed in great detail as are the practical limitations of theorems and the necessity for concern over various types of convergence. The author not only shows what is true but also what is not true. This is an excellent introductory book that includes answers to most questions one might encounter in the solution of typical boundary-value problems.

Heat Diagrams

Wärmediagramme für Grosstechnische Kontaktprozesse. By Johannes Algermissen. Springer Verlag, Germany, 1962. 6 × 9 in., 110 pp. DM 25.50.

REVIEWED BY J. KESTIN[4]

ROUGHLY speaking, people can be divided into algebraists and geometers. The latter are inclined to associate a geometrical construct with every abstract idea in science, and can readily visualize geometrical relations in their imaginations. It is conjectured that the percentage of geometers among engineers is higher than among the remainder of the population, which explains the engineers' *penchant* for graphical methods. The booklet under review has been written in that tradition. It gives a detailed description of a type of diagram pioneered by F. Bošnjaković in which the mol fraction, denoted here by χ, constitutes one of the coordinates. The well-known Mollier diagram for humid air (the so-called h, x diagram) belongs to that class.

The author describes lucidly, but without derivations, the construction of a variety of diagrams for homogeneous reactions in the gaseous phase (with and without inert components), and of heterogeneous reactions in which the gaseous or liquid phase is pure and always present in excess. He then proceeds to show how these diagrams can be used to solve a number of problems involving heat and mass transfer in reactive systems. Every geometer who works in this field will welcome the booklet, because the diagrams developed in it provide a lucid description of the otherwise very complex processes when the details of their occurrence count and must be mustered, notably in predesign studies. This can be very useful, even in cases where the final numerical work is habitually performed on a digital computer.

The booklet does not seem to say the last word on the subject. For example, in the case of a single reaction, the coordinate χ is the mol fraction of a *particular* species. Consequently, the equations on which the design of diagrams is based are unsymmetrical, and your reviewer feels that the choice of de Donder's extent of reaction ξ, defined by $d\xi = dn_i/\nu_i$ (in the usual, American notation), would have simplified matters a great deal. The discussion of isentropic curves and h, s equilibrium diagrams is not considered, and this precludes the use of these instructive diagrams in the study of flow processes, such as in rocket nozzles. It is hoped that such topics will be included in a further edition, and that the use of the diagrams will become much more widespread in this country than it seems to be.

Mathematical Physics

Methods of Mathematical Physics, vol. II. Partial Differential Equations. By Courant and Hilbert. Interscience Publishers, New York, N. Y., 1962. xxii and 830 pp. $17.50.

The original German edition of Courant-Hilbert, vol. 2, has been brought up to date by Professor Courant through footnotes, appendices, and revisions. The theory of characteristics is treated in much more detail, and a discussion of the theory of distributions has been added.—*Ed.*

Transonic Wind Tunnels

Transonic Wind Tunnel Testing. By Bernhard H. Goethert. (AGARDograph No. 49). Pergamon Press, New York, N. Y., 1961. Cloth, 6½ × 10 in., xvii and 397 pp. $17.50.

REVIEWED BY J. LUKASIEWICZ[5]

THIS book represents probably the most thorough treatment, by a major contributor to the field, of a specific aspect of wind tunnel technology yet published. In 16 exhaustive chapters, each provided with an extensive bibliography, the history, theory, and practice of transonic tunnel design and testing are covered. An impressive amount of experimental data, some published for the first time, has been correlated and interpreted, including useful comparisons between free flight and wind tunnel measurements. Perhaps the lack of description of flow visualization instrumentation, which has been developed specifically for transonic wind tunnels, is the only omission noticed by this reviewer. The book is well produced and is amply illustrated with lucid graphs. A full listing of transonic tunnels and their characteristics is included.

A significant portion of the text (as reflected by over a page of index) is devoted to the subject of aerodynamic characteristics of perforated walls. When studying these data, the reader should be cautioned against attributing the wall cross-flow characteristics to their geometry alone since the boundary layer effects can be equally significant—a point not always stressed in the text, the boundary layer data not always being given. As regards walls with inclined perforations, which have the desired reflection characteristics for compression and expansion waves at low supersonic speeds, these are often referred to as "differential-resistance walls" (pp. 157, 171, 183), although, as shown on page 269, they have, in fact, *linear* cross-flow characteristics, whereas

[3] Associate Professor, Division of Applied Mathematics, Brown University, Providence, R. I.

[4] Professor, Division of Engineering, Brown University, Providence, R. I. Mem. ASME.

[5] ARO Inc., Arnold Air Force Station, Tullahoma, Tenn.