

**ROBOT MANIPULATORS:
MATHEMATICS, PROGRAMMING, AND CONTROL**

The Computer Control of Robot Manipulators

Richard P. Paul

The MIT Press
Cambridge, Massachusetts and London, England

CONTENTS

Preface	ix
Introduction	1
Chapter 1	
Homogeneous Transformations	9
Chapter 2	
Kinematic Equations	41
Chapter 3	
Solving Kinematic Equations	65
Chapter 4	
Differential Relationships	85
Chapter 5	
Motion Trajectories	119
Chapter 6	
Dynamics	157
Chapter 7	
Control	197
Chapter 8	
Static Forces	217
Chapter 9	
Compliance	231
Chapter 10	
Programming	245
Index	273