

ASSOC. PROF. DR. ATEF ABDEL-MONEIM ATA
HEAD
DEPARTMENT OF MECHATRONICS ENGINEERING
KULLIYAH OF ENGINEERING, IUM
P.O. BOX. 10, 50728 KUALA LUMPUR

Modeling and Simulation of Dynamic Systems

Modeling and Simulation of Dynamic Systems

Robert L. Woods

*Mechanical and Aerospace Engineering
University of Texas at Arlington*

Kent L. Lawrence

*Mechanical and Aerospace Engineering
University of Texas at Arlington*



PRENTICE HALL, Upper Saddle River, New Jersey 07458

Woods, Robert L.
Modeling and simulation of dynamic systems / Robert L. Woods.
Kent L. Lawrence.

p. cm.
Includes bibliographical references and index.
ISBN 0-13-337379-7
1. Engineering—Mathematical models. 2. Systems engineering—Mathematical models. I. Lawrence, Kent L. II. Title.
TA342.W66 1997
620'.001'1—dc21

96-49673
CIP

Editor-in-chief: Marcia Horton
Acquisitions editor: Bill Stenquist
Managing editor: Bayani Mendoza DeLeon
Project manager: Jennifer Wenzel
Cover director: Amy Rosen
Manufacturing buyer: Julia Meehan
Editorial assistant: Meg Weist



© 1997 by Prentice-Hall, Inc.
Upper Saddle River, New Jersey 07458

All rights reserved. No part of this book may be reproduced, in any form or by any means, without permission in writing from the publisher.

The author and publisher of this book have used their best efforts in preparing this book. These efforts include the development, research, and testing of the theories and programs to determine their effectiveness. The author and publisher make no warranty of any kind, expressed or implied, with regard to these programs or the documentation contained in this book. The author and publisher shall not be liable in any event for incidental or consequential damages in connection with, or arising out of, the furnishing, performance, or use of these programs.

Printed in the United States of America

10 9

ISBN 0-13-337379-7

Prentice-Hall International (UK) Limited, London
Prentice-Hall of Australia Pty. Limited, Sydney
Prentice-Hall Canada Inc., Toronto
Prentice-Hall Hispanoamericana, S.A., Mexico
Prentice-Hall of India Private Limited, New Delhi
Prentice-Hall of Japan, Inc., Tokyo
Prentice-Hall Asia Pte. Ltd., Singapore
Editora Prentice-Hall do Brasil, Ltda., Rio de Janeiro

TRADEMARK INFORMATION

PlexiglasTM is a registered trademark of the Rohm & Haas Company.

MATLABTM is a registered trademark of The MathWorks, Inc.

*To my parents, Aldon Woods and Gwen Woods;
my wife, Brenda; and my daughter, Lori.*

RLW

*To my mother, Doris W. Lawrence; the loving memory
of my father, James H. Lawrence, Sr.; my wife Carol;
and my children, Dory, Kent, Jr., and Jamie.*

KLL