

CONTENTS

Loading the Mathematica Kernel	1
Function Definition	1
Differentiation	1
Antidifferentiation	2
Graphing a Function	2
Piecewise-Defined Function	4
Root Finding	5
Direction Field	5
Symbolic Solution of First Order Linear Differential Equations	6
Limiting Behavior	7
Symbolic Solution of Nonlinear First Order Differential Equations	7
Checking a Solution	8
Graphing Implicit Solutions	8
Symbolic Solution of Second Order Linear Differential Equations	9
Higher Order Linear Differential Equations	9
Numerical Solution of an Initial Value Problem	10

Matrices and First Order Systems	11
Eigenpair Calculation	13
Symbolic Solution of First Order Systems	13
Plotting a Phase Plane Trajectory	14
Phase Plane Analysis of Autonomous 2-Dimensional Systems	15
Laplace Transforms	17
Graphing the Periodic Thrust Velocity	17
Series Expansions	18
Equilibrium Points for Two-Dimensional Autonomous Systems	19
Linearization About an Equilibrium Point	19
Partial Differential Equations and Fourier Series	20
Two-Point Boundary Value Problems	26