

Contents

1. Introduction	1
How This Lab Book Is Organized 2 • Using the Diskette 2 • Where to Go for More Information 3 • Acknowledgments 3	
2. Getting Started with Maple	4
Starting Maple 4 • Basic Maple Syntax 5 • Basic Maple Objects 8 • Mixing and Matching Different Number Types 9 • Strings 10 • Maple Expressions 11 • Sets and Lists 13 • Calling Maple Commands 16 • Assignments and Equations 19 • The Use of Quotes in Maple 22 • Activities for §2 23	
3. First-Order ODEs	25
Defining and Solving First-Order ODEs 25 • Explicit vs. Implicit Solutions 28 • Activities for §3 31	
4. Applications of First-Order ODEs	33
Falling, Floating, or Accelerating Objects 33 • Mixture Problems 40 • Activities for §4 42	

5. Graphical Methods	45
Direction Fields 46 • Some Examples 49 • Activities for §5 53	
6. Homogeneous Linear Differential Equations	56
Activities for §6 63	
7. Non-homogeneous Linear Differential Equations	65
Activities for §7 69	
8. Applications of Linear Differential Equations	71
Free, Undamped Motion 72 • Free, Damped Motion 75 • Activities for §8 81	
9. More Applications and Systems of Differential Equations	83
Forced Motion 83 • Systems of Linear Differential Equations 87 • Activities for §9 89	
10. Phase Planes	91
Activities for §10 98	
11. Matrix Operations	100
Basic Concepts 100 • Characteristic Values and Characteristic Vectors 106 • Activities for §11 109	
12. Matrix Methods of Solution	111
Activities for §12 116	
13. Isoclines	117
Activities for §13 119	
14. Series Solutions	121
Activities for §14 129	

15. Numerical Methods	131
Problems with Numerical Methods 136 • Activities for §15 139	
16. The Laplace Transform	140
Activities for §16 152	
Bibliography	154
Index	157