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## Preface

This manual is designed to be used specifically with the book *Fundamentals of Differential Equations*, 8<sup>th</sup> Edition, by Nagle, Saff, and Snider and the companion book *Fundamentals of Differential Equations and Boundary Value Problems*, 6<sup>th</sup> Edition, by the same authors. It is a second revision of an earlier version of a companion *Maple Manual* by Kenneth Pothoven of the University of South Florida for the sixth edition of the first book and the fourth edition of the second book.

This manual contains valuable information for incorporating computer technology into the teaching and learning of the theory and applications of ordinary differential equations. Specifically it contains information of how to use the computer algebra system *MapleV*. We have found through experience in teaching differential equations that the proper use of technology can greatly enhance the study of differential equations and make many of the concepts meaningful to students.

Included in this manual is all the information you will need to use *Maple* in the instruction of differential equations. (When we refer to *Maple* in this manual we are referring specifically to *Maple* 14. Some of the commands may not work on earlier versions of *Maple*.) The first part of the manual contains a general introduction on the use of *Maple* and is taken directly from the excellent *Online Maple Manual* written by Donald Hartig of California Polytechnic State University to accompany the 11<sup>th</sup> edition of Thomas' *Calculus* book. A chapter giving demonstrations on the use of *Maple* in calculus and differential equations follows this introduction. Fifteen laboratory sessions follow and comprise the heart of the manual, the last of which is on Fourier series, and is completely new. These labs are designed to aid in the understanding of central concepts studied in a standard introductory course in differential equations. Each lab introduces the concepts and demonstrates how *Maple* is used in the context, but then requires the students to become involved in exploratory exercises and questions. The objectives are clearly stated so that the instructor can choose which labs are most appropriate for the course he or she is teaching. A practical goal is to have the students complete four or five labs during a semester. The text closes with suggestions for additional projects for students to do, if desired. Instructors should feel free to modify the laboratories and projects to suit the needs of their students. The additional projects were compiled by Douglas B. Meade of the University of South Carolina.

Ken Pothoven is indebted to students who have tested some of these projects in years past in differential equations classes that he has taught at the University of South Florida.

I am grateful to my son, Christian, who had the tedious task of converting the pdf files of the Pothoven version into editable text files that were eventually imported into *Maple* and reformatted line by line.

I hope that the information and ideas presented in this manual will be useful, interesting, and inspiring to students of differential equations.

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