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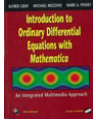
Introduction to Ordinary Differential Equations with Mathematica: An Integrated Multimedia Approach

Authors

Alfred Gray
Michael J. Mezzino Jr.
Mark Pinsky

Book information

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Contents

Basic Concepts | Using Mathematica to Study Differential Equations | First Order Differential Equations | The Package ODE.m | Existence and Uniqueness of Solutions of First Order Differential Equations | Applications of First Order Equations I | Applications of First Order Equations II | Second Order Linear Differential Equations | Second Order Linear Differential Equations with Constant Coefficients | Using ODE.m to Solve Second Order Linear Differential Equations | Applications of Linear Second Order Equations | Higher Order Linear Differential Equations | Numerical Solutions of Differential Equations | The Laplace Transform | Systems of Linear Differential Equations | Linear Systems II | Stability of Nonlinear Systems | Applications of Systems | Power Series Solutions of Second Order Equations | Frobenius Solutions of Second Order Equations | Appendices: Review of Linear Algebra and Matrix Theory; Systems of Units

Description

Book/CD-ROM package that provides a traditional treatment of elementary ordinary differential equations while introducing computer-assisted methods available with Mathematica. Classical solution methods are presented in parallel with those in Mathematica. Models are developed from classical physics, population biology, electrical circuits, and elementary mechanics. Requires knowledge of calculus of one variable. Knowledge of multi-variable calculus and linear algebra is recommended.

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An Integrated Multimedia Approach. Authors: Gray, Alfred, Mezzino, Michael, Pinsky, Mark A. Buy this book. Softcover 84,99 €.

ODE.m enables students to solve differential equations, much as a calculator would. The CD-ROM, in addition to containing ODE.m, also contains the Mathematica solution of worked examples, the Mathematica solution of exercises, a portrait gallery of some 48 mathematicians who have contributed to the field of differential equations, a selection of various Mathematica notebooks, Mathematica movies and sample labs for students. Mathematica programs and additional problem/example files will be made available online through the TELOS Web site (www.telospub.com) and the author's dedicated web site Ordinary Differential Equations and Dynamical Systems.

Gerald Teschl. This is a preliminary version of the book Ordinary Differential Equations and Dynamical Systems published by the American Mathematical Society (AMS). Its main aim is to give a self contained introduction to the field of ordinary differential equations with emphasis on the dynamical systems point of view while still keeping an eye on classical tools as pointed out before. The first part is what I typically cover in the introductory course for bachelor students. The first equation can be integrated with respect to t twice, resulting in $x_1(t) = C_1 + C_2 t$, where C_1, C_2 are the integration constants. Computing the values of x_1, \dot{x}_1 at $t = 0$ shows $C_1 = x_1(0), C_2 = v_1(0)$, respectively.