



# MATLAB Differential Equations

*Cesar Perez Lopez*

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MATLAB is a high-level language and environment for numerical computation, visualization, and programming. Using MATLAB, you can analyze data, develop algorithms, and create models and applications. The language, tools, and built-in math functions enable you to explore multiple approaches and reach a solution faster than with spreadsheets or traditional programming languages, such as C/C++ or Java.

MATLAB Differential Equations introduces you to the MATLAB language with practical hands-on instructions and results, allowing you to quickly achieve your goals. In addition to giving an introduction to the MATLAB environment and MATLAB programming, this book provides all the material needed to work on differential equations using MATLAB. It includes techniques for solving ordinary and partial differential equations of various kinds, and systems of such equations, either symbolically or using numerical methods (Euler's method, Heun's method, the Taylor series method, the Runge–Kutta method,...). It also describes how to implement mathematical tools such as the Laplace transform, orthogonal polynomials, and special functions (Airy and Bessel functions), and find solutions of finite difference equations.

## What you'll learn

- How to use the MATLAB environment
- How to program the MATLAB language from first principles
- How to solve ordinary and partial differential equations symbolically
- How to solve ordinary and partial differential equations numerically, and graph their solutions
- How to solve finite difference equations and general recurrence equations
- How MATLAB can be used to investigate convergence of sequences and series and analytical properties of functions, with working examples

## Who this book is for

This book is for anyone who wants to work in a practical, hands-on manner with MATLAB to solve differential equations. You'll already understand the core topics of undergraduate level applied mathematics, and have access to an installed version of MATLAB, but no previous experience of MATLAB is assumed.

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