



# A Practical Approach to Dynamical Systems for Engineers (Woodhead Publishing Series in Mechanical Engineering)

By Patricia Mellodge

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## A Practical Approach to Dynamical Systems for Engineers (Woodhead Publishing Series in Mechanical Engineering) By Patricia Mellodge

A Practical Approach to Dynamical Systems for Engineers takes the abstract mathematical concepts behind dynamical systems and applies them to real-world systems, such as a car traveling down the road, the ripples caused by throwing a pebble into a pond, and a clock pendulum swinging back and forth.

Many relevant topics are covered, including modeling systems using differential equations, transfer functions, state-space representation, Hamiltonian systems, stability and equilibrium, and nonlinear system characteristics with examples including chaos, bifurcation, and limit cycles.

In addition, MATLAB is used extensively to show how the analysis methods are applied to the examples. It is assumed readers will have an understanding of calculus, differential equations, linear algebra, and an interest in mechanical and electrical dynamical systems.

- Presents applications in engineering to show the adoption of dynamical system analytical methods
- Provides examples on the dynamics of automobiles, aircraft, and human balance, among others, with an emphasis on physical engineering systems
- MATLAB and Simulink are used throughout to apply the analysis methods and illustrate the ideas
- Offers in-depth discussions of every abstract concept, described in an intuitive manner, and illustrated using practical examples, bridging the gap between theory and practice
- Ideal resource for practicing engineers who need to understand background theory and how to apply it



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