

Partial Differential Equations have been developed and used in science and engineering for more than 200 years, yet they remain a very active area of research, both because of their role in mathematics and their application to virtually all areas of science and engineering. This research is due relatively recently to the development of computer solution methods for PDEs that have extended PDE applications in quantifying board areas of physical, chemical, and biological phenomena.

This book surveys some of these new developments in analytical and numerical methods, and relates the two through a series of PDE examples. The PDEs that have been selected are largely, “named” in the sense that they have the names of their original contributors. These names usually reflect that the PDEs are widely recognized and used in many application areas. The development of analytical solutions directly supports the development of numerical methods by providing a spectrum of test problems that can be used to evaluate numerical methods.

Each chapter follows the same unified format throughout the book—

- The PDE and its associated auxiliary conditions are stated
- An analytical solution for the PDE is stated, including the original source of the solution and verification (proof)
- The analytical solution is derived by relatively new procedures using Maple codes and the graphical output that includes a 2D animation
- A series of routines (in Matlab®) is discussed with detailed explanations of the code and how it relates to the PDE
- Final summary suggests concepts and computational approaches that can be applied in new PDE applications

Traveling Wave Analysis of Partial Differential Equations

Traveling Wave Analysis of Partial Differential Equations

*Numerical and
Analytical Methods
with Matlab® and Maple™*

Graham W. Griffiths
William E. Schiesser



ACADEMIC PRESS

An imprint of Elsevier
elsevierdirect.com



ACADEMIC
PRESS

