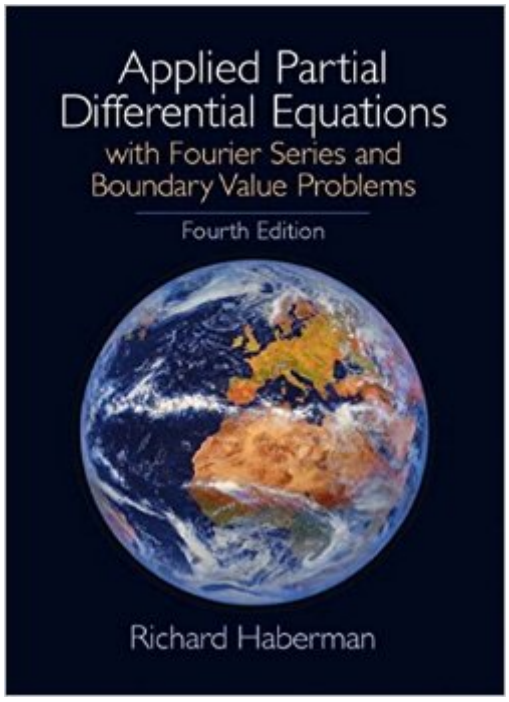
Applied Partial Differential Equations: With Fourier Series And Boundary Value Problems, 4th Edition



Synopsis

Emphasizing the physical interpretation of mathematical solutions, this book introduces applied mathematics while presenting partial differential equations. Topics addressed include heat equation, method of separation of variables, Fourier series, Sturm-Liouville eigenvalue problems, finite difference numerical methods for partial differential equations, nonhomogeneous problems, Green's functions for time-independent problems, infinite domain problems, Green's functions for wave and heat equations, the method of characteristics for linear and quasi-linear wave equations and a brief introduction to Laplace transform solution of partial differential equations. For scientists and engineers.

Book Information

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Customer Reviews

I used this book for my class in second semester Engineering Math and then liking this book so much i decided to read the other half of the book that my class didn't cover so I'm compelled to write this review as I've pretty much (gladly) covered everything this book has to offer.The first 8 Chapters of this book (my class used) i'll probably summarize as 'Heat and Wave equation' since though going through many different methods, the analysis goes back to those equations. The other half of the book is a bit more interesting but may not be as detailed as the previous chapters. Here i will summarize each chapterCh 1: Heat EquationStraight forward discussion of physical phenomenon of the diffusion equation in up to 3 dimensions and use of Laplacian in spherical coordinates.Ch 2: Method of Separation of VariablesThe main point of the book in my opinion. Treatment of more physical phenomenon. Laplace's equation with rectangular, circular boundary values.Ch 3: Fourier

SeriesBasic treatment of Fourier Series. Light treatment of eigenfunction expansion using Fourier series. Sine/Cosine series.Ch 4: Wave EquationPhysical derivation of vertically vibrating string. Vibrating membrane, Snell's Law and Total internal reflection treatment.Ch 5: Sturm-Liouville Eigenvalue ProblemsSL Eigenvalue problems, Review of boundary conditions with first, second, third and periodicity conditions applied to the Heat and Wave equation. Rayleigh quotient (minimization principle) and Green's formula. Simple matrix eigenvalue problems. Self-Adjoint Operators. SL Asymptotic behavior.

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