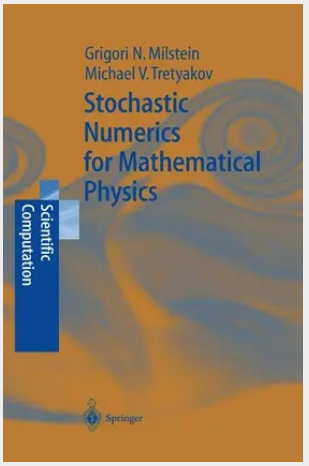
Milstein / Tretyakov

Stochastic Numerics for Mathematical Physics



Stochastic differential equations have many applications in the natural sciences. Besides, the employment of probabilistic representations together with the Monte Carlo technique allows us to reduce solution of multi-dimensional problems for partial differential equations to integration of stochastic equations. This approach leads to powerful computational mathematics that is presented in the treatise. The authors propose many new special schemes, some published here for the first time. In the second part of the book they construct numerical methods for solving complicated problems for partial differential equations occurring in practical applications, both linear and nonlinear. All the methods are presented with proofs and hence founded on rigorous reasoning, thus giving the book textbook potential. An overwhelming majority of the methods are accompanied by the corresponding numerical algorithms which are ready for implementation in practice. The book addresses researchers and graduate students in numerical analysis, physics, chemistry, and engineering as well as mathematical biology and financial mathematics.

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181,89 €
169,99 € (zzgl. MwSt.)

Lieferfrist: bis zu 10 Tage

Artikelnummer: 9783540211105
Medium: Buch
ISBN: 978-3-540-21110-5
Verlag: Springer
Erscheinungstermin: 26.05.2004
Sprache(n): Englisch
Auflage: 2004
Serie: Scientific Computation
Produktform: Gebunden
Gewicht: 1086 g
Seiten: 596
Format (B x H): 160 x 241 mm

Kundenservice Verlag Dr. Otto Schmidt KG
Neumannstraße 10, 40235 Düsseldorf | kundenservice@otto-schmidt.de | 0221-93738-997 (Inland)