ZMATH 2015e.00919

Thuselt, Frank; Gennrich, Felix Paul

Practical mathematics with MATLAB, Scilab and Octave. For engineers and natural scientists. (Praktische Mathematik mit MATLAB, Scilab und Octave. Für Ingenieure und Naturwissenschaftler.)

Heidelberg: Springer Spektrum (ISBN 978-3-642-25824-4/pbk; 978-3-642-25825-1/ebook). xi, 439 p. (2013).

Numerical simulations are important tools for the scientific and industrial work in the natural and engineering sciences. The prerequisites required are appropriate numerical solution methods and adequate programming languages to express the corresponding programs. This book uses three programming languages, which are MATLAB, Scilab, Octave. All three programming environments are treated in detail and about a third of the book is devoted to their installation and usage. The following chapters cover standard material on numerical analysis, which includes computer arithmetic and error analysis, linear systems, nonlinear systems, interpolation and approximation with polynomials, Fourier- and wavelet transformations, numerical integration and differential equations. The presentation concentrates on the numerical programs and no proofs are given. What makes this book unique and very valuable for beginners in scientific computing is the specific design, layout and presentation style of the material which is an effective mixture of text, formulas in some places with annotations, illustrating figures and diagrams, as well as program codes given in all three programming environments. Where possible application examples are given, e.g. the time frequency analysis in the chapter about wavelet transformations. The chapter of differential equations includes a short introduction to the MATLAB tool Simulink, which is a popular interactive tools in the engineering sciences for modeling, simulating and analyzing dynamical systems. The book is in German.

Gudula Rünger (Chemnitz)

Classification: N15
Keywords: practical mathematics; numerical programming; programming languages; computer arithmetic; error analysis; linear systems; nonlinear systems; interpolation; approximation with polynomials; Fourier- and wavelet transformations; numerical integration; differential equations; scientific computing
doi:10.1007/978-3-642-25825-1