



PYTHON PROGRAMMING AND NUMERICAL METHODS

A GUIDE FOR ENGINEERS
AND SCIENTISTS

Qingkai Kong
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Numerical Methods In Engineering With Python

Jaan Kiusalaas



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Python Programming and Numerical Methods Qingkai Kong, Timmy Siau, Alexandre Bayen, 2020-11-27 *Python Programming and Numerical Methods A Guide for Engineers and Scientists* introduces programming tools and numerical methods to engineering and science students with the goal of helping the students to develop good computational problem solving techniques through the use of numerical methods and the Python programming language Part One introduces fundamental programming concepts using simple examples to put new concepts quickly into practice Part Two covers the fundamentals of algorithms and numerical analysis at a level that allows students to quickly apply results in practical settings Includes tips warnings and try this features within each chapter to help the reader develop good programming practice Summaries at the end of each chapter allow for quick access to important information Includes code in Jupyter notebook format that can be directly run online "Numerical Methods using Python (For scientists and Engineers)" Pankaj Dumka, Rishika Dumka, Dhananjay R. Mishra, 2022-11-21 The book is specifically intended for scientists engineers and engineering students who have taken a course on numeric methods and wish to comprehend and learn the subject through programming The book s chapters are written methodically step by step so that programming becomes simple More

emphasis is placed on computationally modelling the methodologies and discussing the numerical method Python is chosen as the programming language because it is simple to comprehend and use compared to other programming languages The book allows readers to use and experiment with the approaches it describes With very few adjustments many of the programmes in the book can be utilised for applications in science and engineering

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ISE Applied Numerical Methods with Python for Engineers and Scientists Steven Chapra, David Clough, 2021 *Programming for Computations - Python* Svein Linge, Hans Petter Langtangen, 2016-07-25 This book presents computer programming as a key method for solving mathematical problems There are two versions of the book one for MATLAB and one for Python The book was inspired by the Springer book TCSE 6 A Primer on Scientific Programming with Python by Langtangen but the style is more accessible and concise in keeping with the needs of engineering students The book outlines the shortest possible path from no previous experience with programming to a set of skills that allows the students to write simple programs for solving common mathematical problems with numerical methods in engineering and science courses The emphasis is on generic algorithms clean design of programs use of functions and automatic tests for verification

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Applied Scientific Computing Peter R. Turner, Thomas Arildsen, Kathleen Kavanagh, 2018-07-18 This easy to understand textbook presents a modern approach to learning numerical methods or scientific computing with a unique focus on the modeling and applications of the mathematical content Emphasis is placed on the need for and methods of scientific computing for a range of different types of problems supplying the evidence and justification to motivate the reader Practical guidance on coding the methods is also provided through simple to follow examples using Python Topics and features provides an accessible and applications oriented approach supported by working Python code for many of the methods encourages both problem and project based learning through extensive examples exercises and projects drawn from practical applications introduces the main concepts in modeling python programming number representation and errors explains the essential details of numerical calculus linear and nonlinear equations including the multivariable Newton method discusses interpolation and the numerical solution of differential equations covering polynomial interpolation splines and the Euler Runge Kutta and shooting methods presents largely self contained chapters arranged in a logical order suitable for an introductory course on scientific computing Undergraduate students embarking on a first course on numerical methods or scientific computing will find this textbook to be an invaluable guide to the field and to the application of these methods across such varied disciplines as computer science engineering mathematics economics the physical sciences and social science

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Solving PDEs in Python Hans Petter Langtangen, Anders Logg, 2017-03-21 This book offers a concise and gentle introduction to finite element programming in Python based on the popular FEniCS software library Using a series of examples including the Poisson equation the equations of linear elasticity the incompressible Navier Stokes equations and systems of nonlinear advection diffusion reaction equations it guides readers through the essential steps to quickly solving a PDE in FEniCS such as how to define a finite variational problem how to set boundary conditions how to solve linear and nonlinear systems and how to visualize solutions and structure finite element Python programs This book is open access under a CC BY license

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use of functions and automatic tests for verification *Automated Solution of Differential Equations by the Finite Element Method* Anders Logg, Kent-Andre Mardal, Garth Wells, 2012-02-24 This book is a tutorial written by researchers and developers behind the FEniCS Project and explores an advanced expressive approach to the development of mathematical software The presentation spans mathematical background software design and the use of FEniCS in applications Theoretical aspects are complemented with computer code which is available as free open source software The book begins with a special introductory tutorial for beginners Following are chapters in Part I addressing fundamental aspects of the approach to automating the creation of finite element solvers Chapters in Part II address the design and implementation of the FEniCS software Chapters in Part III present the application of FEniCS to a wide range of applications including fluid flow solid mechanics electromagnetics and geophysics

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