

Bibliography

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Sorted

Nicholas J. Higham*

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This is the bibliography for the articles in [The Princeton Companion to Applied Mathematics](#) [97] sorted by author name.

References

- [1] David Acheson. Inverted pendulums. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 741–743. Princeton University Press, Princeton, NJ, USA, 2015.
- [2] David Acheson. What’s the big picture? In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 933–935. Princeton University Press, Princeton, NJ, USA, 2015.
- [3] Miguel A. Alonso. Modern optics. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 673–680. Princeton University Press, Princeton, NJ, USA, 2015.

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- [4] Douglas N. Arnold. The flight of a golf ball. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 746–749. Princeton University Press, Princeton, NJ, USA, 2015.
- [5] David H. Bailey and Jonathan M. Borwein. Experimental applied mathematics. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 925–933. Princeton University Press, Princeton, NJ, USA, 2015.
- [6] June Barrow-Green and Reinhard Siegmund-Schultze. The history of applied mathematics. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 55–79. Princeton University Press, Princeton, NJ, USA, 2015.
- [7] Peter Benner. Model reduction. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 117–119. Princeton University Press, Princeton, NJ, USA, 2015.
- [8] Andrew J. Bernoff. The thin-film equation. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 169–170. Princeton University Press, Princeton, NJ, USA, 2015.
- [9] Michael V. Berry and Christopher J. Howls. Divergent series: Taming the tail. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 634–640. Princeton University Press, Princeton, NJ, USA, 2015.
- [10] Jeffrey T. Borggaard, John A. Burns, and Eugene M. Cliff. Optimal sensor location in the control of energy-efficient buildings. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil

- Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 763–767. Princeton University Press, Princeton, NJ, USA, 2015.
- [11] Fred Brauer and P. van den Driessche. The spread of infectious diseases. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 687–694. Princeton University Press, Princeton, NJ, USA, 2015.
 - [12] Thomas J. Brennan, Andrew W. Lo, and Tri-Dung Nguyen. Portfolio theory. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 648–658. Princeton University Press, Princeton, NJ, USA, 2015.
 - [13] David S. Broomhead. Applications of max-plus algebra. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 795–800. Princeton University Press, Princeton, NJ, USA, 2015.
 - [14] Kurt Bryan and Tanya Leise. Cloaking. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 733–735. Princeton University Press, Princeton, NJ, USA, 2015.
 - [15] Dorothy Buck. Knotting and linking of macromolecules. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 752–755. Princeton University Press, Princeton, NJ, USA, 2015.
 - [16] Chris Budd. Slipping, sliding, rattling, and impact: Nonsmooth dynamics and its applications. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 769–771. Princeton University Press, Princeton, NJ, USA, 2015.

- [17] Daniela Calvetti and Erkki Somersalo. Dimensional analysis and scaling. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 90–93. Princeton University Press, Princeton, NJ, USA, 2015.
- [18] Eric Cancès. Electronic structure calculations (solid state physics). In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 847–851. Princeton University Press, Princeton, NJ, USA, 2015.
- [19] René Carmona and Ronnie Sircar. Financial mathematics. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 640–648. Princeton University Press, Princeton, NJ, USA, 2015.
- [20] C. J. Chapman. Aircraft noise. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 783–786. Princeton University Press, Princeton, NJ, USA, 2015.
- [21] C. J. Chapman. Shock waves. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 720–724. Princeton University Press, Princeton, NJ, USA, 2015.
- [22] S. Jonathan Chapman. The Ginzburg–Landau equation. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 148–149. Princeton University Press, Princeton, NJ, USA, 2015.
- [23] Gui-Qiang G. Chen. The Tricomi equation. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 170–171. Princeton University Press, Princeton, NJ, USA, 2015.

- [24] Margaret Cheney and Brett Borden. Radar imaging. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 860–864. Princeton University Press, Princeton, NJ, USA, 2015.
- [25] Peter A. Clarkson. The Painlevé equations. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 163–165. Princeton University Press, Princeton, NJ, USA, 2015.
- [26] William Cook. The traveling salesman problem. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 778–781. Princeton University Press, Princeton, NJ, USA, 2015.
- [27] Robert M. Corless and David J. Jeffrey. The Lambert W function. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 151–155. Princeton University Press, Princeton, NJ, USA, 2015.
- [28] Darren Crowdy. Conformal mapping. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 84–86. Princeton University Press, Princeton, NJ, USA, 2015.
- [29] Jim Crowley. SIAM and science policy in the United States. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 956–959. Princeton University Press, Princeton, NJ, USA, 2015.
- [30] Annie Cuyt. Approximation theory. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 248–262. Princeton University Press, Princeton, NJ, USA, 2015.

- [31] E. Brian Davies. Spectral theory. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 236–248. Princeton University Press, Princeton, NJ, USA, 2015.
- [32] Timothy A. Davis. Searching a graph. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 757–759. Princeton University Press, Princeton, NJ, USA, 2015.
- [33] Timothy A. Davis and Yifan Hu. Graph theory. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 101–103. Princeton University Press, Princeton, NJ, USA, 2015.
- [34] Florent de Dinechin and Jean-Michel Muller. Evaluating elementary functions. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 759–761. Princeton University Press, Princeton, NJ, USA, 2015.
- [35] Mark R. Dennis. The Dirac equation. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 142–144. Princeton University Press, Princeton, NJ, USA, 2015.
- [36] Mark R. Dennis. Invariants and conservation laws. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 106–112. Princeton University Press, Princeton, NJ, USA, 2015.
- [37] Mark R. Dennis. Maxwell’s equations. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 160–162. Princeton University Press, Princeton, NJ, USA, 2015.
- [38] Mark R. Dennis. Schrödinger’s equation. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa,

- and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, page 167. Princeton University Press, Princeton, NJ, USA, 2015.
- [39] Mark R. Dennis. Tensors and manifolds. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 127–130. Princeton University Press, Princeton, NJ, USA, 2015.
 - [40] Jack Dongarra. High-performance computing. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 839–843. Princeton University Press, Princeton, NJ, USA, 2015.
 - [41] David L. Donoho and Victoria Stodden. Reproducible research in the mathematical sciences. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 916–925. Princeton University Press, Princeton, NJ, USA, 2015.
 - [42] Ivar Ekeland. Mathematical economics. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 868–873. Princeton University Press, Princeton, NJ, USA, 2015.
 - [43] Yonina C. Eldar. Compressed sensing. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 823–827. Princeton University Press, Princeton, NJ, USA, 2015.
 - [44] George F. R. Ellis. General relativity and cosmology. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 579–590. Princeton University Press, Princeton, NJ, USA, 2015.

- [45] Charles L. Epstein. Medical imaging. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 816–823. Princeton University Press, Princeton, NJ, USA, 2015.
- [46] Bard Ermentrout. Mathematical neuroscience. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 873–879. Princeton University Press, Princeton, NJ, USA, 2015.
- [47] Maria Esteban. A personal experience in France and Europe of how to influence government as a mathematician. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 954–956. Princeton University Press, Princeton, NJ, USA, 2015.
- [48] Lawrence C. Evans. Partial differential equations. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 190–200. Princeton University Press, Princeton, NJ, USA, 2015.
- [49] Hans G. Feichtinger. Function spaces. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 99–101. Princeton University Press, Princeton, NJ, USA, 2015.
- [50] Martin Feinberg. Chemical reactions. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 627–634. Princeton University Press, Princeton, NJ, USA, 2015.
- [51] Alistair D. Fitt. Making the case for U.K. mathematics research in a rapidly changing environment. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 959–961. Princeton University Press, Princeton, NJ, USA, 2015.

- [52] Irene Fonseca and Giovanni Leoni. Calculus of variations. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 218–226. Princeton University Press, Princeton, NJ, USA, 2015.
- [53] L. B. Freund. Mechanics of solids. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 505–516. Princeton University Press, Princeton, NJ, USA, 2015.
- [54] David F. Gleich and Paul G. Constantine. Ranking web pages. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 755–757. Princeton University Press, Princeton, NJ, USA, 2015.
- [55] Paul Glendinning. Bifurcation theory. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 393–402. Princeton University Press, Princeton, NJ, USA, 2015.
- [56] Paul Glendinning. Chaos and ergodicity. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 82–83. Princeton University Press, Princeton, NJ, USA, 2015.
- [57] Paul Glendinning. Complex systems. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 83–84. Princeton University Press, Princeton, NJ, USA, 2015.
- [58] Paul Glendinning. The Euler–Lagrange equations. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, page 147. Princeton University Press, Princeton, NJ, USA, 2015.

- [59] Paul Glendinning. Hybrid systems. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 103–104. Princeton University Press, Princeton, NJ, USA, 2015.
- [60] Paul Glendinning. The logistic equation. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 156–158. Princeton University Press, Princeton, NJ, USA, 2015.
- [61] Paul Glendinning. The Lorenz equations. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 158–159. Princeton University Press, Princeton, NJ, USA, 2015.
- [62] Joe D. Goddard. Granular flows. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 665–673. Princeton University Press, Princeton, NJ, USA, 2015.
- [63] Kenneth M. Golden. The mathematics of sea ice. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 694–705. Princeton University Press, Princeton, NJ, USA, 2015.
- [64] Timothy Gowers. Mathematical writing. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 897–903. Princeton University Press, Princeton, NJ, USA, 2015.
- [65] Thomas A. Grandine. A hybrid symbolic–numeric approach to geometry processing and modeling. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 787–790. Princeton University Press, Princeton, NJ, USA, 2015.

- [66] Andreas Griewank. Automatic differentiation. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 749–752. Princeton University Press, Princeton, NJ, USA, 2015.
- [67] David Griffiths. Quantum mechanics. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 411–419. Princeton University Press, Princeton, NJ, USA, 2015.
- [68] Peter Grindrod. Evolving social networks, attitudes, and beliefs—and counterterrorism. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 800–804. Princeton University Press, Princeton, NJ, USA, 2015.
- [69] Julio C. Gutiérrez-Vega. Mathieu functions. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 159–160. Princeton University Press, Princeton, NJ, USA, 2015.
- [70] Ernst Hairer and Christian Lubich. Numerical solution of ordinary differential equations. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 293–305. Princeton University Press, Princeton, NJ, USA, 2015.
- [71] Ian Hawke. Numerical relativity. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 680–687. Princeton University Press, Princeton, NJ, USA, 2015.
- [72] Stephan Held, Stefan Hougardy, and Jens Vygen. Chip design. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 804–808. Princeton University Press, Princeton, NJ, USA, 2015.

- [73] Didier Henrion. Convexity. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 89–90. Princeton University Press, Princeton, NJ, USA, 2015.
- [74] Willy A. Hereman. The Korteweg–de Vries equation. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 150–151. Princeton University Press, Princeton, NJ, USA, 2015.
- [75] Desmond J. Higham. Bayesian inference in applied mathematics. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 658–661. Princeton University Press, Princeton, NJ, USA, 2015.
- [76] Nicholas J. Higham. Algorithms. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 40–49. Princeton University Press, Princeton, NJ, USA, 2015.
- [77] Nicholas J. Higham. The Black–Scholes equation. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 137–138. Princeton University Press, Princeton, NJ, USA, 2015.
- [78] Nicholas J. Higham. Color spaces and digital imaging. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 808–813. Princeton University Press, Princeton, NJ, USA, 2015.
- [79] Nicholas J. Higham. Control. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 88–89. Princeton University Press, Princeton, NJ, USA, 2015.

- [80] Nicholas J. Higham. Finite differences. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 95–96. Princeton University Press, Princeton, NJ, USA, 2015.
- [81] Nicholas J. Higham. The finite-element method. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, page 96. Princeton University Press, Princeton, NJ, USA, 2015.
- [82] Nicholas J. Higham. Floating-point arithmetic. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 96–97. Princeton University Press, Princeton, NJ, USA, 2015.
- [83] Nicholas J. Higham. Functions of matrices. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 97–99. Princeton University Press, Princeton, NJ, USA, 2015.
- [84] Nicholas J. Higham. Goals of applied mathematical research. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 48–55. Princeton University Press, Princeton, NJ, USA, 2015.
- [85] Nicholas J. Higham. How to read and understand a paper. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 903–906. Princeton University Press, Princeton, NJ, USA, 2015.
- [86] Nicholas J. Higham. The Jordan canonical form. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 112–113. Princeton University Press, Princeton, NJ, USA, 2015.

- [87] Nicholas J. Higham. The language of applied mathematics. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 8–27. Princeton University Press, Princeton, NJ, USA, 2015.
- [88] Nicholas J. Higham. Methods of solution. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 27–40. Princeton University Press, Princeton, NJ, USA, 2015.
- [89] Nicholas J. Higham. Numerical linear algebra and matrix analysis. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 263–281. Princeton University Press, Princeton, NJ, USA, 2015.
- [90] Nicholas J. Higham. Orthogonal polynomials. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, page 122. Princeton University Press, Princeton, NJ, USA, 2015.
- [91] Nicholas J. Higham. Programming languages: An applied mathematics view. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 828–839. Princeton University Press, Princeton, NJ, USA, 2015.
- [92] Nicholas J. Higham. The singular value decomposition. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 126–127. Princeton University Press, Princeton, NJ, USA, 2015.
- [93] Nicholas J. Higham. The Sylvester and Lyapunov equations. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Com-*

- panion to Applied Mathematics*, pages 168–169. Princeton University Press, Princeton, NJ, USA, 2015.
- [94] Nicholas J. Higham. Variational principle. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, page 134. Princeton University Press, Princeton, NJ, USA, 2015.
 - [95] Nicholas J. Higham. What is applied mathematics? In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 1–8. Princeton University Press, Princeton, NJ, USA, 2015.
 - [96] Nicholas J. Higham. Workflow. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 912–916. Princeton University Press, Princeton, NJ, USA, 2015.
 - [97] Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors. *The Princeton Companion to Applied Mathematics*. Princeton University Press, Princeton, NJ, USA, 2015.
 - [98] Nicholas J. Higham and P. A. Martin. Integral transforms and convolution. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 104–105. Princeton University Press, Princeton, NJ, USA, 2015.
 - [99] Theodore P. Hill. Benford’s law. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 135–137. Princeton University Press, Princeton, NJ, USA, 2015.
 - [100] Philip Holmes. Dynamical systems. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 383–393. Princeton University Press, Princeton, NJ, USA, 2015.

- [101] David W. Hughes. Magnetohydrodynamics. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 476–485. Princeton University Press, Princeton, NJ, USA, 2015.
- [102] Julian C. R. Hunt. Turbulence. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 724–732. Princeton University Press, Princeton, NJ, USA, 2015.
- [103] Richard D. James. Continuum mechanics. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 446–458. Princeton University Press, Princeton, NJ, USA, 2015.
- [104] Oliver E. Jensen. Mathematical biomechanics. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 609–616. Princeton University Press, Princeton, NJ, USA, 2015.
- [105] Chandrika Kamath. Data mining and analysis. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 350–360. Princeton University Press, Princeton, NJ, USA, 2015.
- [106] Randall D. Kamien. Soft matter. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 516–523. Princeton University Press, Princeton, NJ, USA, 2015.
- [107] Jonathan Peter Keating. Random-matrix theory. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 419–428. Princeton University Press, Princeton, NJ, USA, 2015.

- [108] David E. Keyes. Computational science. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 335–350. Princeton University Press, Princeton, NJ, USA, 2015.
- [109] Barbara Lee Keyfitz. Conservation laws. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 86–88. Princeton University Press, Princeton, NJ, USA, 2015.
- [110] Barbara Lee Keyfitz. Shocks. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 122–124. Princeton University Press, Princeton, NJ, USA, 2015.
- [111] David Krakauer and Daniel N. Rockmore. The mathematics of adaptation (or the ten avatars of Vishnu). In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 591–597. Princeton University Press, Princeton, NJ, USA, 2015.
- [112] Rainer Kress. Integral equations. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 200–208. Princeton University Press, Princeton, NJ, USA, 2015.
- [113] Alan J. Laub. The Riccati equation. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 165–167. Princeton University Press, Princeton, NJ, USA, 2015.
- [114] Anita T. Layton. Mathematical physiology. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 616–623. Princeton University Press, Princeton, NJ, USA, 2015.

- [115] Randall J. LeVeque. Tsunami modeling. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 712–720. Princeton University Press, Princeton, NJ, USA, 2015.
- [116] Rachel Levy. Industrial mathematics inspires mathematical modeling tasks. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 940–943. Princeton University Press, Princeton, NJ, USA, 2015.
- [117] W. R. B. Lionheart. Airport baggage screening with X-ray tomography. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 866–868. Princeton University Press, Princeton, NJ, USA, 2015.
- [118] Peter Lynch. Numerical weather prediction. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 705–712. Princeton University Press, Princeton, NJ, USA, 2015.
- [119] Malcolm A. H. MacCallum. Einstein’s field equations. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 144–146. Princeton University Press, Princeton, NJ, USA, 2015.
- [120] Dian I. Martin and Michael W. Berry. Text mining. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 887–891. Princeton University Press, Princeton, NJ, USA, 2015.
- [121] P. A. Martin. Asymptotics. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 81–82. Princeton University Press, Princeton, NJ, USA, 2015.

- [122] P. A. Martin. Bessel functions. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, page 137. Princeton University Press, Princeton, NJ, USA, 2015.
- [123] P. A. Martin. Boundary layer. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, page 82. Princeton University Press, Princeton, NJ, USA, 2015.
- [124] P. A. Martin. The Burgers equation. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, page 138. Princeton University Press, Princeton, NJ, USA, 2015.
- [125] P. A. Martin. The Cauchy–Riemann equations. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, page 139. Princeton University Press, Princeton, NJ, USA, 2015.
- [126] P. A. Martin. Complex analysis. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 173–181. Princeton University Press, Princeton, NJ, USA, 2015.
- [127] P. A. Martin. The diffusion equation. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, page 142. Princeton University Press, Princeton, NJ, USA, 2015.
- [128] P. A. Martin. The Euler equations. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 146–147. Princeton University Press, Princeton, NJ, USA, 2015.
- [129] P. A. Martin. The gamma function. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, page 148. Princeton University Press, Princeton, NJ, USA, 2015.

- [130] P. A. Martin. Hooke’s law. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 149–150. Princeton University Press, Princeton, NJ, USA, 2015.
- [131] P. A. Martin. Laplace’s equation. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 155–156. Princeton University Press, Princeton, NJ, USA, 2015.
- [132] P. A. Martin. The shallow-water equations. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 167–168. Princeton University Press, Princeton, NJ, USA, 2015.
- [133] P. A. Martin. Singularities. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 124–125. Princeton University Press, Princeton, NJ, USA, 2015.
- [134] P. A. Martin. The wave equation. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, page 171. Princeton University Press, Princeton, NJ, USA, 2015.
- [135] P. A. Martin. Wave phenomena. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, page 134. Princeton University Press, Princeton, NJ, USA, 2015.
- [136] Youssef Marzouk and Karen Willcox. Uncertainty quantification. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 131–133. Princeton University Press, Princeton, NJ, USA, 2015.
- [137] Moshe Matalon. Flame propagation. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared

- Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 852–857. Princeton University Press, Princeton, NJ, USA, 2015.
- [138] Sean McKee. Modeling a pregnancy testing kit. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 864–866. Princeton University Press, Princeton, NJ, USA, 2015.
 - [139] Ross C. McPhedran. Effective medium theories. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 500–505. Princeton University Press, Princeton, NJ, USA, 2015.
 - [140] John G. McWhirter and Ian Proudler. Signal processing. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 533–545. Princeton University Press, Princeton, NJ, USA, 2015.
 - [141] Beatrice Meini. Markov chains. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 116–117. Princeton University Press, Princeton, NJ, USA, 2015.
 - [142] James D. Meiss. Ordinary differential equations. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 181–190. Princeton University Press, Princeton, NJ, USA, 2015.
 - [143] Heather Mendick. Mediated mathematics: Representations of mathematics in popular culture and why these matter. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 943–952. Princeton University Press, Princeton, NJ, USA, 2015.

- [144] Peter D. Miller. Perturbation theory and asymptotics. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 208–218. Princeton University Press, Princeton, NJ, USA, 2015.
- [145] H. K. Moffatt. Fluid dynamics. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 467–476. Princeton University Press, Princeton, NJ, USA, 2015.
- [146] H. K. Moffatt. The Navier–Stokes equations. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 162–163. Princeton University Press, Princeton, NJ, USA, 2015.
- [147] Esteban Moro. Network analysis. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 360–374. Princeton University Press, Princeton, NJ, USA, 2015.
- [148] Qing Nie. Systems biology. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 879–883. Princeton University Press, Princeton, NJ, USA, 2015.
- [149] Harald Niederreiter. Random number generation. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 761–762. Princeton University Press, Princeton, NJ, USA, 2015.
- [150] Amy Novick-Cohen. The Cahn–Hilliard equation. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 139–140. Princeton University Press, Princeton, NJ, USA, 2015.

- [151] Bernt Øksendal and Agnès Sulem. Applications of stochastic analysis. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 319–327. Princeton University Press, Princeton, NJ, USA, 2015.
- [152] Alexander V. Panfilov. Cardiac modeling. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 623–627. Princeton University Press, Princeton, NJ, USA, 2015.
- [153] Nicola Parolini and Alfio Quarteroni. Sport. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 598–604. Princeton University Press, Princeton, NJ, USA, 2015.
- [154] Kristin Potter and Chris R. Johnson. Visualization. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 843–847. Princeton University Press, Princeton, NJ, USA, 2015.
- [155] Andrea Prosperetti. Bubbles. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 735–737. Princeton University Press, Princeton, NJ, USA, 2015.
- [156] Anders Rantzer and Karl Johan Åström. Control theory. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 523–533. Princeton University Press, Princeton, NJ, USA, 2015.
- [157] Marcos Raydan. Nonlinear equations and Newton’s method. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 120–122. Princeton University Press, Princeton, NJ, USA, 2015.

- [158] Daniel N. Rockmore. The fast Fourier transform. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 94–95. Princeton University Press, Princeton, NJ, USA, 2015.
- [159] Donald G. Saari. From the N -body problem to astronomy and dark matter. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 771–774. Princeton University Press, Princeton, NJ, USA, 2015.
- [160] Donald G. Saari. Voting systems. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 891–895. Princeton University Press, Princeton, NJ, USA, 2015.
- [161] Fadil Santosa. Homogenization. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, page 103. Princeton University Press, Princeton, NJ, USA, 2015.
- [162] Fadil Santosa. The level set method. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 114–116. Princeton University Press, Princeton, NJ, USA, 2015.
- [163] Fadil Santosa. Multiscale modeling. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 119–120. Princeton University Press, Princeton, NJ, USA, 2015.
- [164] Fadil Santosa and William W. Symes. Inverse problems. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 327–335. Princeton University Press, Princeton, NJ, USA, 2015.
- [165] Guillermo Sapiro. Mathematical image processing. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil

- Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 813–816. Princeton University Press, Princeton, NJ, USA, 2015.
- [166] Arnd Scheel. Pattern formation. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 458–467. Princeton University Press, Princeton, NJ, USA, 2015.
 - [167] Emily Shuckburgh. Earth system dynamics. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 485–500. Princeton University Press, Princeton, NJ, USA, 2015.
 - [168] Valeria Simoncini. Krylov subspaces. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 113–114. Princeton University Press, Princeton, NJ, USA, 2015.
 - [169] Malcolm C. Smith. Inerters. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 604–609. Princeton University Press, Princeton, NJ, USA, 2015.
 - [170] Roel Snieder. Imaging the Earth using Green’s theorem. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 857–860. Princeton University Press, Princeton, NJ, USA, 2015.
 - [171] Frank Sottile. Algebraic geometry. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 570–579. Princeton University Press, Princeton, NJ, USA, 2015.
 - [172] Ian Stewart. How to write a general interest mathematics book. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 906–912. Princeton University Press, Princeton, NJ, USA, 2015.

- [173] Ian Stewart. Symmetry in applied mathematics. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 402–410. Princeton University Press, Princeton, NJ, USA, 2015.
- [174] Gilbert Strang. A symmetric framework with many applications. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 661–665. Princeton University Press, Princeton, NJ, USA, 2015.
- [175] Gilbert Strang. What to teach and how? In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 938–940. Princeton University Press, Princeton, NJ, USA, 2015.
- [176] Endre Süli. Numerical solution of partial differential equations. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 306–319. Princeton University Press, Princeton, NJ, USA, 2015.
- [177] Nico M. Temme. Special functions. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 227–235. Princeton University Press, Princeton, NJ, USA, 2015.
- [178] David Tong. Classical mechanics. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 374–383. Princeton University Press, Princeton, NJ, USA, 2015.
- [179] Warwick Tucker. Computer-aided proofs via interval analysis. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 790–795. Princeton University Press, Princeton, NJ, USA, 2015.

- [180] Warwick Tucker. Interval analysis. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 105–106. Princeton University Press, Princeton, NJ, USA, 2015.
- [181] Peter R. Turner. Computation, modeling, and projects. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 935–938. Princeton University Press, Princeton, NJ, USA, 2015.
- [182] P. J. Upton. The delta function and generalized functions. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 139–141. Princeton University Press, Princeton, NJ, USA, 2015.
- [183] Sergio Verdú. Information theory. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 545–552. Princeton University Press, Princeton, NJ, USA, 2015.
- [184] Cédric Villani and Clément Mouhot. Kinetic theory. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 428–446. Princeton University Press, Princeton, NJ, USA, 2015.
- [185] Jens Vygen. Combinatorial optimization. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 564–570. Princeton University Press, Princeton, NJ, USA, 2015.
- [186] Charles W. Wampler. Robotics. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 767–769. Princeton University Press, Princeton, NJ, USA, 2015.

- [187] Z. Jane Wang. Insect flight. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 743–746. Princeton University Press, Princeton, NJ, USA, 2015.
- [188] Denis Weaire and Stefan Hutzler. Foams. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 737–741. Princeton University Press, Princeton, NJ, USA, 2015.
- [189] Walter Willinger. Communication networks. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 883–887. Princeton University Press, Princeton, NJ, USA, 2015.
- [190] Peter Winkler. Applied combinatorics and graph theory. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 552–564. Princeton University Press, Princeton, NJ, USA, 2015.
- [191] Stephen J. Wright. Continuous optimization (nonlinear and linear programming). In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 281–293. Princeton University Press, Princeton, NJ, USA, 2015.
- [192] Lexing Ying. The N -body problem and the fast multipole method. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 775–778. Princeton University Press, Princeton, NJ, USA, 2015.
- [193] Ya-xiang Yuan. How Chinese mathematicians influence government. In Nicholas J. Higham, Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa, and Jared Tanner, editors, *The Princeton Companion to Applied Mathematics*, pages 953–954. Princeton University Press, Princeton, NJ, USA, 2015.