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Titolo	Number-crunching [[electronic resource]] : taming unruly computational problems from mathematical physics to science fiction / Paul J. Nahin
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Edizione	[Course Book]
Descrizione fisica	1 online resource (406 p.)
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Soggetti	Mathematical physics - Data processing Mathematical physics
Lingua di pubblicazione	Inglese
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Note generali	"A collection of challenging problems in mathematical physics that roar like lions when attacked analytically, but which purr like kittens when confronted by a high-speed electronic computer and its powerful scientific software (plus some speculations for the future from science fiction)."
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Frontmatter -- Contents -- Introduction -- 1. Feynman Meets Fermat -- 2. Just for Fun: Two Quick Number-Crunching Problems -- 3. Computers and Mathematical Physics -- 4. The Astonishing Problem of the Hanging Masses -- 5. The Three-Body Problem and Computers -- 6. Electrical Circuit Analysis and Computers -- 7. The Leapfrog Problem -- 8. Science Fiction: When Computers Become Like Us -- 9. A Cautionary Epilogue -- Appendix -- Solutions to the Challenge Problems -- Acknowledgments -- Index -- Also By Paul J. Nahin
Sommario/riassunto	How do technicians repair broken communications cables at the bottom of the ocean without actually seeing them? What's the likelihood of plucking a needle out of a haystack the size of the Earth? And is it possible to use computers to create a universal library of everything ever written or every photo ever taken? These are just some of the intriguing questions that best-selling popular math writer Paul Nahin tackles in Number-Crunching. Through brilliant math ideas and entertaining stories, Nahin demonstrates how odd and unusual math

problems can be solved by bringing together basic physics ideas and today's powerful computers. Some of the outcomes discussed are so counterintuitive they will leave readers astonished. Nahin looks at how the art of number-crunching has changed since the advent of computers, and how high-speed technology helps to solve fascinating conundrums such as the three-body, Monte Carlo, leapfrog, and gambler's ruin problems. Along the way, Nahin traverses topics that include algebra, trigonometry, geometry, calculus, number theory, differential equations, Fourier series, electronics, and computers in science fiction. He gives historical background for the problems presented, offers many examples and numerous challenges, supplies MATLAB codes for all the theories discussed, and includes detailed and complete solutions. Exploring the intimate relationship between mathematics, physics, and the tremendous power of modern computers, Number-Crunching will appeal to anyone interested in understanding how these three important fields join forces to solve today's thorniest puzzles.
