The book was found

Chases And Escapes: The Mathematics Of Pursuit And Evasion

PAUL J. NAHIN
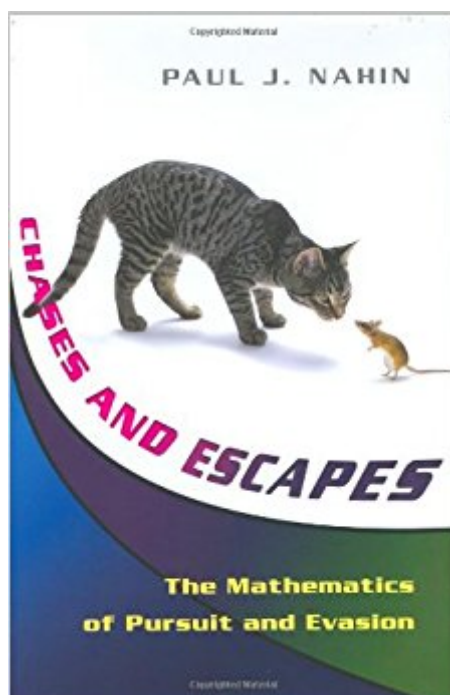
CHASES AND ESCAPES

The Mathematics
of Pursuit and Evasion

Synopsis

We all played tag when we were kids. The rules couldn't be easier--one player is designated "it" and must try to tag out one of the others. What most of us don't realize is that this simple chase game is in fact an application of pursuit theory, and that the same principles of games like tag, dodgeball, and hide-and-seek are at play in military strategy, high-seas chases by the Coast Guard, even romantic pursuits. In Chases and Escapes, Paul Nahin gives us the first complete history of this fascinating area of mathematics. Writing in an accessible style that has been enjoyed by popular-math enthusiasts everywhere, Nahin traces the development of modern pursuit theory from its classical analytical beginnings to the present day. Along the way, he informs his mathematical discussions with fun facts and captivating stories. Nahin invites readers to explore the different approaches to solving various chase-and-escape problems. He draws upon game theory, geometry, linear algebra, target-tracking algorithms--and much more. Nahin offers an array of challenging puzzles for beginners on up, providing historical background for each problem and explaining how each one can be applied more broadly. Chases and Escapes includes solutions to all problems and provides computer programs that readers can use for their own cutting-edge analysis. This informative and entertaining book is the first comprehensive treatment of the subject, one that is sure to appeal to anyone interested in the mathematics that underlie the all-too-human endeavor of pursuit and evasion.

Book Information

Hardcover: 272 pages

Publisher: Princeton University Press (July 22, 2007)

Language: English

ISBN-10: 0691125147

ISBN-13: 978-0691125145

Product Dimensions: 9.2 x 6.5 x 0.9 inches

Shipping Weight: 1.3 pounds

Average Customer Review: 4.7 out of 5 stars   8 customer reviews

Best Sellers Rank: #707,673 in Books (See Top 100 in Books)   #190 inÃ Â Books > Science & Math > Evolution > Game Theory   #244 inÃ Â Books > Humor & Entertainment > Puzzles & Games > Math Games   #603 inÃ Â Books > Science & Math > Mathematics > History

Customer Reviews

"In the 18th century, mathematicians began to tease apart how best to track down and intercept

prey, inspired by pirate ships bearing down on merchant vessels. The mathematics is by no means trivial, and quickly becomes fiendish if the merchant ship takes evasive action. This is just one of the colorful problems in Paul Nahin's fascinating history of the mathematics of pursuit, in which he guides us masterfully through the maths itself--think lions and Christians, submarines and torpedoes, and the curvaceous flight of fighter aircraft."--New Scientist"This book contains a well-written, well-organized collection of solutions to twenty-one challenging calculus and differential equation problems that concern pursuit and evasion as well as the historical background of each problem type."--Mathematics Teacher"I am sure that this book will appeal to everyone who is interested in mathematics and game theory. Excellent work. Cheers."--Prabhat Kumar Mahanti, Zentralblatt Math"This is a highly readable book that offers several colorful applications of differential equations and good examples of non-trivial integrals for calculus students. It would be a good source of examples for the classroom and or a starting point for an independent project."--Bill Satzer, MAA Review

"Nahin provides beautiful applications of calculus, differential equations, and game theory. If you are pursuing an enjoyable collection of mathematical problems and the stories behind them, then your search ends here."--Arthur Benjamin, Harvey Mudd College "I know of no better way to grasp the basic concepts of calculus than to study pursuit-and-escape problems. Paul Nahin has made a superb survey of the vast field of such problems, from Zeno's paradox of Achilles and the tortoise through the famous four bugs that once made the cover of Scientific American. Not only does he make clear the required differential equations, but he traces each problem's colorful history. No book on the topic could be more definitive or a greater pleasure to read."--Martin Gardner "Chases and Escapes is a superb treatment of the solutions to a variety of pursuit-evasion problems, some classic and others more contemporary. The content is accessible to undergraduates in mathematics or the physical sciences, with lots of supporting detail included. The author's lively writing style makes for enjoyable reading."--David M. Burton, University of New Hampshire "This book is a treasure trove of puzzles and an enjoyable read. Nahin's aim is to assemble a varied collection of pursuit-and-evasion problems. Fully worked solutions, from first principles, are presented for each problem. Problems are carefully set in their historical context. I am not aware of another book that covers pursuit-and-evasion problems in anywhere near as much detail as is presented here."--Nick Hobson, creator of the award-winning Web site Nick's Mathematical Puzzles "This is a well-written and novel book that is comprehensively researched and enthusiastically presented. Nahin offers a very good mixture of elegant math and lively historical interludes. I wasn't aware the topic had such

a rich history and wide scope."--Desmond Higham, University of Strathclyde

Suppose you are given a problem which says: "Three dogs are placed at the vertices of an equilateral triangle; they run one after the other. What is the curve described by each of them?" How would you solve the problem? If this makes you scratch your head a little, don't worry. This problem actually appeared on the Cambridge University Mathematical Tripos Examination in 1871 and is one of the so-called "n-bug" problem. Obviously when n goes to infinity, the curve of each bug becomes a circle. On p. 110, Professor Nahin started to analyze this problem by writing down the radial and transverse components of the velocity, and step-by-step, he showed us how to solve this seemingly complicated problem, yet only elementary calculus (and perhaps some college physics) is needed. The approach is elegant. This book, which has a subtitle of The Mathematics of Pursuit and Evasion, obviously has a lot of mathematics and many equations, and it is not for general readers who are afraid of math. However, the book provides many elegant pursuit problems with military applications. For those who enjoy the real applications of calculus and perhaps like do some calculations on the back of an envelope, this is a superb book.

Make sure you've had at least through Calc II if you want to navigate this book! Awesome to have some practical applications for all of it finally though.

I found this book interesting, but difficult to understand at times. I read it to apply the principles to law enforcement such as missing persons.

Awesome little book on a very interesting subject!! The author does an excellent job with this easy to read gem.

Whenever you see a Paul NahinÃƒÂ¢Ã â ¬Ã â„¢s book, you may expect something nice, well-written about a theme in mathematics. With an undeniable ability to transform technical subjects into tasty and readable texts (for the layman), this partucular book is a treat for those interested in graph theory. CanÃƒÂ¢Ã â ¬Ã â„¢t miss it!

very interesting

Pursuit theory has been a favorite mathematical recreation of mine since the early 1990's. In this

book, the author explores many continuous and discrete pursuit/evasion situations with clarity and succinctness. I encourage anyone with a background in differential equations to work through the problems in this book. They are rewarding and may very well inspire new discoveries on the subject.For the lay person, the problems are intriguing in their own right (e.g., "Pursuit of Invisible Targets") but the solutions are derived and expressed mathematically. At the very least, this book presents a truly fascinating application of mathematics to anyone who picks it up.

This is an excellent review of the math of pursuit and escape paths. I have not read the book completely, but I concentrated my reading on a couple of problems I was mostly interested in: The Lady in the Lake problem, and the Lion-and-Man problem. These two problems are strictly connected, and have more immediate geometric explanations than the equations of the problems presented in the book. However, these alternative explanations are missing in the book; too bad because they add a lot to the understanding and intuition of the problems. In one case actually, (Lion-and-Man problem), I believe the outcome of the problem is different from the one provided. This doesn't detract from this enjoyable book, which is well written, with very approachable, step-by-step math passages.

Chases and Escapes: The Mathematics of Pursuit and Evasion Quick Escapes Minneapolis-St. Paul, 3rd: 25 Weekend Getaways in and around the Twin Cities (Quick Escapes Series) Quick Escapes Philadelphia, 2nd: 24 Weekend Getaways from the City of Brotherly Love (Quick Escapes Series) Quick Escapes Detroit, 3rd: 26 Weekend Getaways from the Motor City (Quick Escapes Series) Quick Escapes St. Louis: 25 Weekend Getaways from the Gateway City (Quick Escapes Series) Great Escapes: Long Island (Great Escapes) Stick Dog Chases a Pizza Stick Dog 3-Book Collection: Stick Dog, Stick Dog Wants a Hot Dog, Stick Dog Chases a Pizza The Curse of Cash: How Large-Denomination Bills Aid Crime and Tax Evasion and Constrain Monetary Policy SURVIVAL, EVASION, AND RECOVERY Tax Havens: International Tax Avoidance and Evasion Offshore Tax Evasion: IRS Tax Compliance FATCA/FBAR Star Force: Evasion (Star Force Universe Book 34) The Pursuit of God/The Pursuit of Man Fractal Geometry and Dynamical Systems in Pure and Applied Mathematics I: Fractals in Pure Mathematics (Contemporary Mathematics) In Pursuit of the Traveling Salesman: Mathematics at the Limits of Computation Provencal Escapes: Inspirational Homes in Provence and the Cote D'Azur Connect & Color: Great Escapes Dot-to-Dot: Beautiful Places to Reveal and Color North! Or Be Eaten: Wild escapes. A desperate journey. And the ghastly Fangs of Dang. (The Wingfeather Saga Book 2) The Tunnels:

Escapes Under the Berlin Wall and the Historic Films the JFK White House Tried to Kill