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Optimal Stopping and Free-Boundary Problems

From the contents:

- Optimal stopping: General facts
- Stochastic processes: A brief review
- Optimal stopping and free-boundary problems
- Methods of solution
- Optimal stopping in stochastic analysis
- Optimal stopping in mathematical statistics
- Optimal stopping in mathematical finance
- Optimal stopping in financial engineering

The book aims at disclosing a fascinating connection between optimal stopping problems in probability and free-boundary problems in analysis using minimal tools and focusing on key examples. The general theory of optimal stopping is exposed at the level of basic principles in both discrete and continuous time covering martingale and Markovian methods. Methods of solution explained range from classic ones (such as change of time, change of space, change of measure) to more recent ones (such as local time-space calculus and nonlinear integral equations). A detailed chapter on stochastic processes is included making the material more accessible to a wider cross-disciplinary audience. The book may be viewed as an ideal compendium for an interested reader who wishes to master stochastic calculus via fundamental examples. Areas of application where examples are worked out in full detail include financial mathematics (American, Russian, Asian options), financial engineering (optimal prediction of the ultimate maximum), mathematical statistics (sequential testing, quickest detection), and stochastic analysis (fundamental inequalities). Large portions of the text were not exposed in a book format before. The book also suggests a number of new avenues for research.

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