Optimization Methods in Finance

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1 Theory of Dynamic Programming

- 1. Notion of sequential decision making.
- 2. How to identify the global optimal solution.
- 3. Principal steps in the Dynamic Programming methodology.
- 4. The Matrix Chain multiplication problem.
- 5. The binary knapsack problem.
- 6. An application from finance.

2 Options Pricing

- 1. Applicability of decision Models to Finance
- 2. Dynamic Programming in Finance.
- 3. European Options.
- 4. American Options.
- 5. Using a binomial lattice to price a simple American option.

3 Structuring asset-backed securities

- 1. Complex assets.
- 2. Mortgage-backed securities.
- 3. Pricing a mortgage.
- 4. Present value relationship.