Optimization methods in economics and finance

Book: *The structure of economics: a mathematical analysis*, E. Silberberg, W. Suen

Program

1. Unconstrained optimization. First order necessary conditions, second order sufficient condition. The profit maximization problem.
2. Constrained optimization. First order necessary conditions. Second order condition. The Lagrange multiplier. The geometry of constrained problem. The utility maximization problem for a consumer subject to a total budgetary expenditure.
3. The envelope theorem for unconstrained and constrained problems. The indirect objective function. Interpretation of the Lagrange multiplier. Reviewing the profit maximization problem and the consumer's utility maximization problem.
4. The consumer demand curves. The Roy's identity. The Marshallian demands. The Hicksian demands. The Slutsky equations.
5. Optimization with inequality constraints. The Kuhn-Tucker conditions. Duality in linear programming. Duality for convex programming. The saddle point theorem.