

Optimization Methods in Finance

Ranya Almohsen
LDCSEE
West Virginia University

April 14, 2015

1 Combinatorial Auctions

1. Motivation example.
2. How the auctioneer can maximize his revenue by solving integer program, (how to set up the objective function and the constraints).
3. Explain an example.
4. Exercise.

4 Portfolio Optimization with Minimum Transaction Levels

1. Markowitz model.
2. Solve for the optimal portfolio by using quadratic programming.
3. Check whether the optimal solution satisfies the transaction level constraint.

2 The lockbox Problem

1. The lockbox problem.
2. Example that shows the advantage of using the integer program.
3. Solve the example in two different ways and compare them.
4. Exercise.

3 Constructing an index fund

1. Definition of active portfolio and passive portfolio.
2. Definition of the index fund.
3. The rising popularity of index funds can be explained both theoretically and empirically: market efficiency, empirical performance, transaction cost.
4. Large scale deterministic model.
5. A linear programming model.