Technische Universität Berlin
Institut für Mathematik

Dr. Rüdiger Stephan

Mathematical Tools for Engineering and Management
Winter Term 2011/2012

November 30, 2011

Exercise sheet 6

Exercise 1

(a) Formulate the TSP as an integer program.

(b) Design a branch-and-cut algorithm for solving the traveling salesman problem. For this, consider the following aspects:

(i) Determine the number of subtour elimination constraints.

(ii) Initialize an integer program for the TSP by ignoring the subtour elimination constraints. Describe the solution space of this integer program.

(iii) Given an optimal solution of this integer program, how one can detect a violated subtour eliminitaion constraint?

(c) Implement the branch-and-cut approach using AIMMS. Solve the instance provided on the homepage. The steps in detail are:

(i) Model the graph with arc costs and read in the data.

(ii) Model the initial integer program and solve it. (Describe the solution.)

(iii) Implement an algorihm to cut off this solution.

(iv) Combine your models within a branch-and-cut framework.