Discrete Optimisation
Exercise Session 5: Formulation Comparison

October 16, 2015

Exercise 1 (undirected travelling salesman formulations)**.** Given a list of cities and the distances between each pair, the undirected travelling salesman problem finds the shortest path that visits each city exactly once while returning to the original city. It has applications outside operational research; for example, to manufacture microchips, in order to minimise delays, every component must be placed as closely as possible to the other ones; the components' position can also be optimised.

1. Propose two formulations for the undirected travelling salesman.

2. Prove that both are equivalent, meaning that $P_{\mathrm{cut}} = P_{\mathrm{sub}}$.

3. Implement both formulations and compare the solving times when increasing the size of the problem.