

Computational Integer Programming

PD Dr. Ralf Borndörfer
Dr. Thorsten Koch

Exercise sheet 11

Deadline: Thu, 19 Jan. 2012, by email to koch@zib.de

Exercise 1.

20 points

Model finding (semi) Magic Knight Tours on an $n \times n$ board using ZIMPL. Solve the model with SCIP and report the largest n for which you can find a solution.

A description of Magic Squares can be found here:

http://en.wikipedia.org/wiki/Magic_square

A description of Knight Tours can be found here:

http://en.wikipedia.org/wiki/Knight%27s_tour

A (semi) Magic Knight Tour is a semi Magic Square, where the sequence of fields with increasing numbers forms a knights tour.

Details:

- We only want a semi Magic Square, i.e., the sums of the diagonals do not need to have a specific value.
- The numbers used for the fields of the Magic Square of size $n \times n$ should be in range $1 \dots n^2$.
- The starting field is arbitrary, i.e., it is your choice. There are no restrictions.
- The Knights Tour can be a path, i.e., the last field need not to be anywhere related to the first field.

Exercise 2.

10 points

Find the missing part in the proof for the quality of the Christofides TSP heuristics presented in the lecture.