

# TSIH: Two-Stage Iterative Heuristic

TSIH (Two-Stage Iterative Heuristic) is a customized heuristic algorithm developed for our paper. It integrates the Lin-Kernighan heuristic (LKH) to solve the Traveling Salesman Problem (TSP) in the first stage, and a second-stage optimization process based on SOCP (Second-Order Cone Programming) to refine the solution.

## Code Structure

1. **Main\_TSIH.cpp**

Contains the main implementation of the TSIH algorithm, including the two-stage iterative process, diversification strategies, and iterative refinement. This is the main entry point of the program.

2. **Solve\_SOCP.h** and **Solve\_SOCP.cpp**

Implement the SOCP model used in the second stage of TSIH.

## Running TSIH

To run TSIH, you also need to integrate the LKH code into the project:

1. Download the LKH source code from:  
<http://webhotel4.ruc.dk/~keld/research/LKH/>
2. Extract the package and open the LKH source files.
3. Remove the original main function file LKHmain.c from the LKH source (to avoid conflicts with Main\_TSIH.cpp).
4. Add all .c files (except LKHmain.c) from LKH into your C++ project's *source* folder.
5. Add all .h files from LKH into your C++ project's *header* folder.
6. Ensure the LKH files are compiled together with Main\_TSIH.cpp, Solve\_SOCP.h, and Solve\_SOCP.cpp.