Ph. D Theses

Thesis 1: I applied a new objective function for the initial route construction. The new objective function takes also the relative width of the time windows into account next to the travel distance, waiting time and savings. I pointed out the improving effect of the new objective function on the number of routes of the initial solutions.

Thesis 2: I elaborated a procedure for route initialization (for seed selection) based on a probability function constructed for this purpose. I introduced intelligent solutions, designed implemented and evaluated a sequential and a parallel route construction. I described a probability function based route construction algorithm.

Thesis 3: I determined then mathematically and computationally tested for VRP: continuous cost control aids route elimination.

Thesis 4: I introduced new methods into the route elimination procedure: 3-Opt operations for search space extension, Repair Algorithm, Post Search and Multi-Strategy Application. I checked the effects of the new methods by computation.

Thesis 5: I applied two-level tabu list management and introduced the dynamic tabu list. I evaluated the new methods and some neighbourhood operators. I specified the algorithm of the realized Tabu Search with dynamic tabu list and two-level tabu management.

Thesis 6: I worked out the Guided Route Elimination concept, which is the core element of the two-phase hybrid metaheuristic, its main purpose is the extension of the search space. I introduced the search blocks and determined their cycle number. I gave the specification of the Guided Route Elimination.

Thesis 7: I made a computer implementation for the developed two phase hybrid metaheuristic. I categirized the procedures and documented the program, made computational runs and compared the results to the best international heuristics, showing that HGRE is one of the best one developed so far in this subject.

Budapest, 30. August 2006.

Sándor Csiszár