

Basic heuristics to CVRP

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(Toth - Vigo : Chap. 5)

Main classes of heuristics:

- 1) classical (mostly used)
- 2) metaheuristics: deep analysis of the "most promising" solutions within the solution space (better quality solutions but larger computational effort)

Classical heuristics:

- 1) constructive: they construct a feasible solution step by step, without improving phases
- 2) Two-phase heuristics:
 - phase I: partitioning of the set of nodes into subsets (one subset for each tour) < cluster determination >

- phase II: determination of a tour for each cluster

In turn, the two-phase heuristics classify into:

- "cluster-first, route-second"
(as described above)
- "route-first, cluster-second"

3) improvement heuristics: given a current solution (e.g. obtained by 1) or 2)), they perform steps to improve it (local search, taboo search ...)

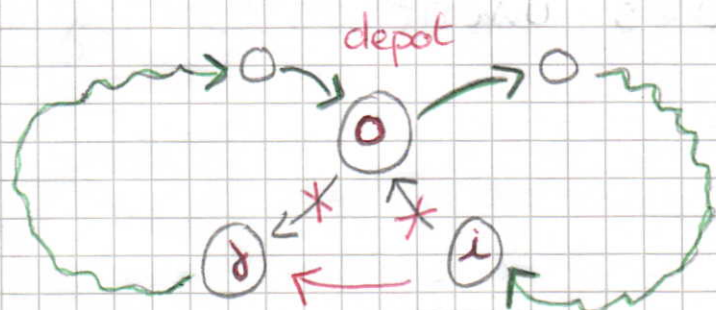
Savings algorithm

(Clarke & Wright)

(Toth - Vigo: Chap 5.2.1)

- constructive heuristic

Basic idea: given two feasible routes



- what is the cost variation if we merge the two routes into a unique (feasible) route as indicated above?
- the corresponding cost variation, or saving, is:

$$S_{ij} = c_{i0} + c_{0j} - c_{ij}$$

Notice: it is called saving since $S_{ij} > 0$ indicates an overall cost reduction (or saving)