

Logistics and Supply Chain Management

Exercise Sheet 2 – Transportation Logistics

Exercise 2.1 (MC):

2.1.1 What is the subtour elimination constraint used for in the travelling salesman problem?

- a) To ensure that start and end node are not the same.
- b) To eliminate tours that are shorter than the maximum distance.
- c) To eliminate tours with different tour lengths.
- d) To ensure that only one tour is created.

2.1.2 What is calculated in the savings matrix?

- a) Savings in tour distance, when one node is deleted in comparison to one tour with all nodes.
- b) Savings in tour distance, when two nodes are in the same tour compared to a separate tour for each node.
- c) Savings in tour distance, when tours are created by the sequence of their coordinates compared to separate tours for each node.
- d) Savings in tour distance, when a central hub is used as distribution point, rather than separate tours for each node pair.

Exercise 2.2:

Consider the following symmetric distance table between cities 1-5 and the depot 0 – as well as the demand of each city. The goal is to construct tours for trucks who can drive a maximum distance of 150 and fulfill a maximum of 80 demand units per tour.

	0	1	2	3	4	5	Demand
0	0	72	53	48	10	32	
1		0	12	29	48	76	40
2			0	48	70	47	4
3				0	28	70	34
4					0	19	52
5						0	27

- a) Ignore the capacity restrictions and create a round tour via the method of successive insertion. Insert nodes in the sequence of their indices.
- b) Create a feasible tour plan by using the tour of a) and allocate the sequence to trucks so that the capacity restrictions are fulfilled.
- c) Create a tour plan with the sweep method without optimizing the created tours after the sweeping (indices are already ordered by polar coordinates).

