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in Auckland

Integer Programming and Delay Management

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Exercise 1: Graph the event-activity network for the following timetable:

Line 765		Line 4711		Line 007	
dep. station A	10:25	dep. station E	10:25	dep. station D	10:40
arr. station B	10:35	arr. station B	10:36	arr. station C	10:55
dep. station B	10:40	dep. station B	10:41	dep. station C	10:58
arr. station C	10:55	arr. station C	10:56	arr. station F	11:10
dep. station C	10:58	dep. station C	10:59		
arr. station D	11:10	arr. station F	11:15		

Exercise 2:
Consider the delay management problem without capacity constraints in the special case in which

- all source delays have the same amount, i.e., $d_i \in \{0, D\}$ for all $i \in \mathcal{E}$, and
- all slack times are equal to zero, i.e., $s_a = 0$ for all $a \in \mathcal{A}$.

Formulate the delay management problem (DM-pure) with constant passengers' weights (and O_5) as IP and show that its coefficient matrix is totally unimodular in this case.

Exercise 3:
Are there (apart from the never-meet property) any really simple cases in which one need not worry about updating the passengers' weights in the optimization?

Think of the structure of the network and about the structure of the passengers' data.

Exercise 4: Which heuristics can you think of for fixing the capacity constraints?

Exercise 5:
Give a definition of a *recovery robust timetable*.

Exercise 6:
Which online strategies can you think of for the delay management problem?