Constructive Combinatorics
Problem Set 7

So 2018

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Exercise 1 We organized the relevant information of "wien.zip" in a mysql db "wien.sql" which you can find in the attachement. For each question you can also find the queries we used to compute the answer, each in a ".mysql" file. (I hope you can open everything - I've never tried to output and send a db before). Either way, the column names are almost the ones from the csv files in wien.zip. The only big difference is that we only keeped the minutes from the timestamp in stop_times table.

(a) Let $\mathcal{N} = (G, \mathcal{L})$ be the line network. Then $n(G) = 19$ and $m(G) = 25$.
(b) The driving, waiting and transfer activities are 50, 40 and 138, respectively.
(c) The sum of the periodic tension of all driving activities is 303, of all waiting 0 and of all transfer activities 604, which makes a total periodic tension of 907.

Exercise 2 We developed a C++ program which (in theory) takes a line network, produces the periodic EAN, computes a spanning tree and a cycle basis for every non-edge of this tree and finally produces an lp file containing a MIP cycle-and-slack formulation of the problem. Unfortunately both SCIP and NEOS are convinced that my problem is infeasible, so I suppose there is a bug hidden somewhere, which I could not locate since yesterday. A (supposed) cycle basis is in the network.lp file to find. The variables are of the form:

X[0-2][(|)][0-3][a|d]_X[0-2][(|)][0-3][a|d]

where: _ orders two events, each one of them starts with X and regarding the rest: [0-2] stands for the line number, [(|)] stands for the direction choice, [0-3] stands for the stop number of the line and [a|d] stands for arrival or departure. Of course, this variable denotes the according oriented activity (from the left event to the right one).