Institut for Matematik og Datalogi
Syddansk Universitet

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JBJ

DM867 – Spring 2022 – Weekly Note 7 (New Version!)

Stuff covered in Week 10

- Nash-Williams orientation theorem. From Notes on Weekly note 6.
- Orientations with degree bounds. BJG Section 8.7 (we covered pages 446 to 447 top as well as Theorem 8.7.3 and its proof).
- Gomory-Hu trees. Based on Section 8.6 in Korte and Vygen, Combinatorial Optimization, Springer Verlag 2002. Via slides.

Lectures in Week 11

As I am currently down with Covid, the monday class will be cancelled. Instead you should watch two videos from DM817 as indicated below.

- Minimum cost flows and circulations. BJG Section 3.10 (watch DM817 video on BJG Section 3.10)
- The directed Chinese postman problem. BJG Section 3.11.2 (watch DM817 video on BJG Section 3.11)
- Finding subdigraphs with prescribed in- and out-degrees. BJG Section 3.11.3 (watch DM817 video on BJG Section 3.11)
- The Chinese postman problem and shortest paths in undirected graphs. We will use Sections 14.5 and 14.6 from the book 'Graphs, Networks and algorithms' by D. Jungnickel, Springer Verlag.
- Certificates for k-strong connectivity of digraphs. BJG Section 7.16

Exercise

Find a Gomory-Hu tree for the graph below. In order to check your solution against the one we will produce in class you should always choose, among all possible choices for the set X one such which contains the lexicographically smallest pair which have not been separated by any of the cuts found so far and we should find a min cut for those two vertices as in the algorithm. That is, if forexample the current tree T had vertices $X_1 = \{b, c, f\}$, $X_2 = \{a, d, h\}$, $X_3 = \{i\}$ and $X_4 = \{e, g\}$, then we should choose X_2 and

find a minimum (a, d)-cut in the graph obtained from G by contracting the non-trivial connected components of $T - X_2$.