

## DM817 – Fall 2022 – Weekly Note 10

### Video lectures in week 48:

- Ahuja 19.2 on maximum weight closures [Video 27]
- BJB 2nd edition pages 342-345 on minimum cost branchings (we will not cover the part on matroids. These pages are available from the home page) [Video 28]
- BJB 8.7-8.8 on submodular flows (we only cover definitions and applications) [Video 29]

### Exercises to discuss in week 49:

- Ahuja 19.3
- BJB 8.53, 8.64
- Show how to formulate the problem of deciding whether an undirected graph  $G$  has  $k$  edge-disjoint spanning trees as a submodular flow problem. Hint: First show that  $G$  has edge-disjoint spanning trees  $T_1, T_2, \dots, T_k$  if and only if there exist an orientation  $D$  of  $G$  which has  $k$  arc-disjoint out-branchings from  $r$ , where  $r$  is any (but fixed) vertex of  $G$ . Then formulate the problem of reorienting the arcs of a digraph so as to obtain a new digraph with  $k$  arc-disjoint out-branchings rooted at  $r$  as a submodular flow problem.
- Exam problems part B 2018: problems 2 (b)-(c), 3 and 4
- Exam problems part B 2020: problems 2, and 4