

Seminar 5

(S5.1) Figure 1 represents a flow network $N = (D, c, s, t)$.

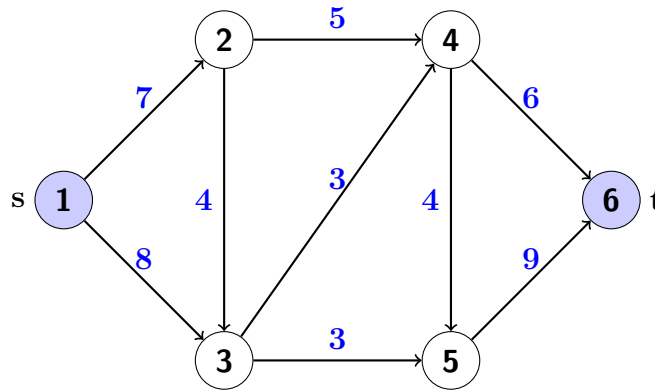


Figure 1: The flow network N

Write the corresponding digraph D and the capacity function c .

(S5.2) Find vectors b, d and a matrix B such that

$$\max\{\text{value}(f) \mid f \text{ is an } s-t \text{ flow for } N\} = \max\{d^T f \mid Bf \leq b\}.$$

(S5.3) Figure 2 represents an $s-t$ flow f for the network N .

- (i) Verify that f is an $s-t$ flow. What is the value of f ?
- (ii) Show that the set $\{(2, 4), (3, 4), (3, 5)\}$ is an $s-t$ cut and compute its capacity.
- (iii) Prove that f is a maximum flow.

(S5.4) Give two iterations of the Ford-Fulkerson algorithm for the flow network N , considering the path $P = 1246$ for the first augmentation and $Q = 1356$ for the second augmentation.

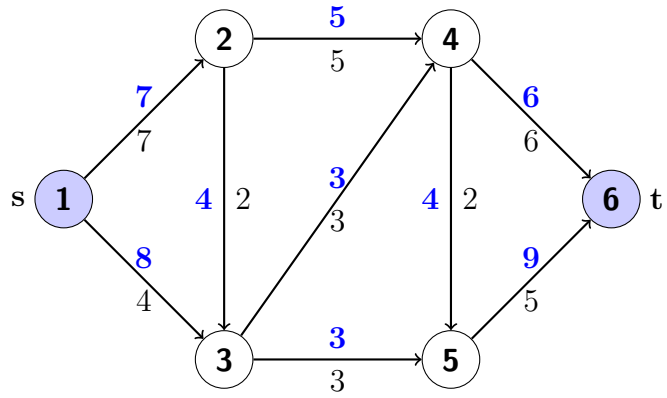


Figure 2: The flow network N with the flow f