

Home work for
Fundamental Algorithms
 SS 2007
 Sheet 7

Exercise 18:

For a flow network (G, s, t, c) , $G = (V, E)$, the sensitivity σ is defined as the maximum decrease of the value of a maximum flow that can be caused by the deletion of a single edge from G . A most important edge (MIE) is defined as an edge $e \in E$, such that its deletion from G results in a decrease of σ of the maximum flow value. Prove or disprove:

- a) A flow network can have more than one MIE.
- b) If $e \in E$ is MIE then $c(e) = \max_{e \in E} c(e)$.
- c) If $e \in E$ is MIE and f is a maximum flow in (G, s, t, c) then $f(e) = \max_{e \in E} f(e)$.
- d) If $e \in E$ is MIE and f is a maximum flow in (G, s, t, c) then there exists a cut (S, T) such that $f(e) \geq \max_{e \in S \times T \cap E} f(e)$.
- e) If $e \in E$ is not contained in any minimum cut of (G, s, t, c) then e is not a MIE.

Exercise 19: Apply the generic Preflow Push Method to the following network (compare exercise 14).

