Übungsblatt 6

Exercise 17. *Given a flow network (G, s, t, c), the algorithm* ShortestAugmenting-Paths *correctly computes a maximum flow, even if the termination criterion of the practical improvement is used.*

Proof of Ex. 17. Suppose $\exists (u, v) \in E_f$ with $u \in S,\ v \in T$.
By construction of (S, T) we know :

$$d(u) > i_1;\ d(v) < i_1 \Rightarrow d(v) + 1 \leq i_1$$

$$\Rightarrow d(u) > i_1 \geq d(v) + 1 \lightning$$

Show now (S, T) is a minCut:

$$\forall u \in S, v \in T: \quad c_f(u, v) = c(u, v) - f(u, v) \leq 0$$
$$\Leftrightarrow c(u, v) \leq f(u, v) \Rightarrow c(u, v) = f(u, v)$$

$$f(S, T) = |f| = c(S, T)$$

Noch zu beweisen: Rückwärtiger Fluss ist 0 □