Optimization I: Linear and Network Optimization

12th Handout

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Algorithm 1: Algorithm of Klein to compute min cost flows

MinCostFlow-Klein(G, l, u, b, c)

Input : A simple directed graph $G = (V, R, \alpha, \omega)$ with capacity functions $0 \leq l(r) \leq u(r)$ for all $r \in R$, desired excess values $b\colon V \to \mathbb{R}$ and flow costs $c\colon R \to \mathbb{R}_+$.

Output: A minimum cost b-flow f. If l, u and c are integral, so is f.

1 Compute a feasible b-flow f // Can be done by computing a maximum flow
2 **while** *the residual network* G_f *contains a negative cycle* C **do**
3 Let $\Delta := \min_{\sigma r \in C} c(\sigma r)$ be the minimal residual capacity along C
4 Augment f along C by Δ // Eliminate the negative cycle C
5 **return** f