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Q3.

Given flow network and budget  $K$  for increasing capacities

Find max possible flow under these situations  
(write a formula to solve)

$$G = (V, E), s, t, \{c_e\}_{e \in E}$$

$$\text{MAX } \sum_{(u,t) \in E} f_{ut}$$

Max the sum of flow on edges entering the sink

Constraints

$$\forall (u,v) \in E \quad f_{uv} \leq c_{uv} + k_{uv}$$

flow on an edge must be less than its capacity plus  $k_{uv}$

$$\sum_{(u,v) \in E} k_{uv} \leq K$$

$K$  constraint

$$\forall u \in V / \{s, t\} \quad \sum_{v \in V} (u,v) = 0$$

conservation of Flow

$$\forall (u,v) \in E \quad k_{uv} \geq 0$$