Davie Truong

I have read and agree to the collaboration policy. Davie Truong

Homework Heavy

CMPS 102 – Spring 2017 – Homework 3

Solution to problem 3

A) For a flow to be acyclic there must be no directed cycles in the subgraph of edges with positive flow. Suppose we have the compliment in which there is a directed cycle of positive flow on every edge. If we continuously remove the min flow edges from the cycle, while maintaining flow, the we have subgraph flow that is equivalent to the max flow. By removing edges with each step, the total positive flow will decrease, thus the subgraph will be acyclic with max flow.

B) Assume S-T flow exist, meaning there is at least one path to get from S-T. A path flow is a flow with positive values that are directed and go from S-T, meaning it can’t contain an edge that goes “backwards” as in the opposite direction of T. Since this is the case, the graph can’t create a cycle and therefore must be acyclic. The reason it is a finite combination of path flows is because without the backward edges, the amount of remaining paths e <= E the total paths in the graph being the upper bound.

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