

Homework 1

To be finished individually. Due on Thursday, January 20, 2011.

1. (10 points) You are given an undirected graph. The problem is to remove a minimum number of edges such that the residual graph contains no triangle. (I.e., there is no three vertices a, b, c such that edges $(a, b), (b, c), (c, a)$ are all in the residual graph.) Give a factor 3 approximation algorithm that runs in polynomial time.
2. (10 points) Let $G = (V, E)$ be an undirected graph with nonnegative edge costs. S , the senders and R , the receivers, are disjoint subsets of V . The problem is to find a minimum cost subgraph of G such that for every receiver r in R , there is at least one sender s in S such that there is a path connecting r to s in the subgraph. Give a factor 2 approximation algorithm that runs in polynomial time. Hint: Consider introducing an additional vertex to the graph, and try building on an approximation algorithm (for a different problem) that we covered in class.