Homework 4[*]

CS 719, Semester II, 1996-97

Friday February 21, 1997

1. Suppose that we permute the rows and columns of the node-arc incidence matrix $\mathcal{I}$ of a graph $\mathcal{G}$. Is the modified matrix a node-arc incidence matrix of some graph $\mathcal{G}'$? If so, how are $\mathcal{G}'$ and $\mathcal{G}$ related?
2. Figure 11.25 specifies two spanning trees for the minimum cost flow problem shown in Figure 11.24(a). For Figure 11.25(a), compute the spanning tree solution assuming that all nontree arcs are at their lower bounds. For Figure 11.25(b), compute the spanning tree solution assuming that all nontree arcs are at their upper bounds.
3. Assume that the spanning trees in Figure 11.25 have node 1 as their root. Specify the predecessor, depth, thread, and reverse thread indices of the nodes.
4. Compute the node potentials associated with the tree shown in Figure 11.25, which are the spanning trees of the minimum cost flow problem given in Figure11.24(a). Verify that for each node j, the node potential $\pi(j)$ equals the length of the tree path from node j to the root.

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[*] Homework due in class one week after assigned. No late homework accepted.