

Operations Research, Spring 2015

Pre-lecture Problems for Lecture 8

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Note. You do not need to submit anything.

1. (0 point) Consider the directed network

$$G = (V, E) = \left(\begin{array}{l} \{O, A, B, C, D, E, T\}, \\ \{(O, A), (O, B), (O, C), (A, B), (A, D), (B, C), \\ (B, D), (B, E), (C, E), (D, E), (D, T), (E, T)\} \end{array} \right)$$

with arc weights defined in the following table:

(i, j)	(O, A)	(O, B)	(O, C)	(A, B)	(A, D)	(B, C)
weight	2	5	4	2	7	1
(i, j)	(B, D)	(B, E)	(C, E)	(D, E)	(D, T)	(E, T)
weight	4	3	4	1	5	7

- (a) Depict G .
- (b) Treat arc weights as distances, formulate the shortest path problem from O to A as an IP.
- (c) Show that the coefficient matrix of the IP in (b) is totally unimodular.
2. (0 point) Consider the network G in Problem 1.
- (a) Treat arc weights as capacities, formulate the maximum flow problem from O to A as an IP.
- (b) Show that the coefficient matrix of the IP in (b) is totally unimodular.