

Operations Research

Homework 6

Due via Moodle/Mailbox by Wednesday, October 21, 2020

1. A construction company needs a heavy excavator for a three-year project. Since maintenance is expensive, it may be cheaper to replace the machine in the interim. The overall net cost (in 1000 €) of purchasing the excavator at the beginning of year i and trading it at the end of year j is as follows.

Purchase start of year	Trade in end of year		
	1	2	3
1	25	60	95
2	–	29	65
3	–	–	37

The task is to find the most economical schedule of purchasing and trading in the excavator(s).

- (a) Draw a graphical representation and show that this is a shortest path problem.
 - (b) Solve the problem. This is most easily done by hand in this case.
2. (a) Write a Pyomo program to solve the maximum flow problem for the Seervada Park example from Hillier and Lieberman, with the network data reproduced here. The arcs are directed and have a flow capacity as indicated.
 - (b) Ask the solver to return dual variables as well. Print out the dual variables that correspond to the capacity constraints. Use the results to identify the minimum cut and draw the minimum cut into the network.

