National Steel Corporation Multi-Period Planning LP Problem
DSA/ISE 5113

The National Steel Corporation (NSC) produces a special-purpose steel that is used in the aircraft and aerospace industries. The marketing department of NSC has received orders for 2400, 2200, 2700, and 2500 tons of steel during each of the next four months. NSC can meet these demands by producing the steel, by drawing from its inventory or by a combination of both.

The production costs per ton of steel during each of the next four months are projected to be \$7400, \$7500, \$7600 and \$7800. Because of these inflationary costs, it might be advantageous for NSC to produce more steel than it needs in a given month and store the excess, although production capacity can never exceed 4000 tons in any month. All production takes place at the beginning of the month and immediately thereafter the demand is met. The remaining steel is then stored in inventory at a holding cost of \$120/ton for each month that it remains there.

If the inventory at the beginning of the first month is 1000 tons of steel and the inventory level at the end of the fourth month should be at least 1500 tons.

Formulate a mathematical program for NSC that will minimize the total production cost over the next four months while satisfying the demand.