Dual Problem

Formulating the dual constraints and variables

Objective function

(Max Z) = 80d1 + 60d2 + 70d3 - 100s1 - 120s2

where d1 = Price received at the warehouse 1

d2 = Price received at the warehouse 2

d3 = Price received at the warehouse 3

s1 = Price purchased at the plant A

s2 = Price purchased at the plant B

subject to

d1 - s1 >= 622

d2 - s1 >= 614

d3 - s1 >= 630

d1 - s2 >= 641

d2 - s2 >= 645

d3 - s2 >= 649

Economic interpretation of dual

The objective of AEDs company is to minimize the combined cost of production and shipping.

In order to do that, the company should employ a logistics company to handle the transportation who will buy the AEDs and ship them to different warehouses with a goal to minimize the combined cost of production and shipping.

The constraints in the dual can be modified as

d1 >= 622 + s1

d2 >= 614 + s1

d3 >= 630 + s1

d1 >= 641 + s2

d2 >= 645 + s2

d3 >= 649 + s2

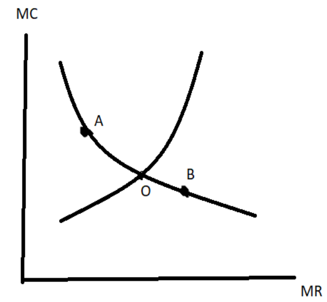
This can be formulated as below

MR >= MC

Marginal Cost (MC): By Increasing the quantity, the additional cost which has added is called Marginal Cost

Marginal Revenue (MR): By Selling the additional unit, the income which is gained is called Marginal Revenue.

Marginal Revenue should be greater than or equal to Marginal Cost to get profit. The plot between MR and MC is defined below



From the curve we see that at the point of intersection MR=MC and on moving the points to A or B i.e., MR>MC or MC<MR.

At Points A and B, the optimum value cannot be obtained. At the point O where MR = MC, Maximization of the profit is obtained for the dual problem. In turn Minimisation of the cost is obtained for primal problem.