qmm

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Objective Function:The Objective function is to Maximize the profit (Z)

Max Z = 420L1 + 360M1 + 300S1 + 420L2 + 360M2 + 300S2 + 420L3 + 360M3 + 300S3

Where P1, P2, P3 are the Plant1, Plant2 and Plant3 and L, M, S be the sizes of the product. Therefore, Li,Mi,Si will be the sizes in planti where i=1,2,3

Subject to the below constraints:

L1 + M1 + S1 <= 750

L2 + M2 + S2 <= 900

L3 + M3 + S3 <= 450

20L1 + 15M1 + 12S1 <= 13000

20L2 + 15M2 + 12S2 <= 12000

20L3 + 15M3 + 12S3 <= 5000

L1 + L2 + L3 <= 900

M1 + M2 + M3 <= 1200

S1 + S2 + S3 <= 750

The constraints are written as follows

L1 + M1 + S1 + 0L2 + 0M2 + 0S2 + 0L3 + 0M3 + 0S3 <= 750

0L1 + 0M1 + 0S1 + L2 + M2 + S2 + 0L3 + 0M3 + 0S3 <= 900

0L1 + 0M1 + 0S1 + 0L2 + 0M2 + 0S2 + L3 + M3 + S3 <= 450

20L1 + 15M1 + 12S1 + 0L2 + 0M2 + 0S2 + 0L3 + 0M3 + 0S3 <= 13000

0L1 + 0M1 + 0S1 + 20L2 + 15M2 + 12S2 + 0L3 + 0M3 + 0S3 <= 12000

0L1 + 0M1 + 0S1 + 0L2 + 0M2 + 0S2 + 20L3 + 15M3 + 12S3 <= 5000

L1 + 0M1 + 0S1 + L2 + 0M2 + 0S2 + L3 + 0M3 + 0S3 <= 900

0L1 + M1 + 0S1 + 0L2 + M2 + 0S2 + 0L3 + M3 + 0S3 <= 1200

0L1 + 0M1 + S1 + 0L2 + 0M2 + S2 + 0L3 + 0M3 + S3 <= 750

Solving LP Model Using R

library(lpSolve)  
  
object\_func <- c(420, 420, 420,  
 360, 360, 360,  
 300, 300, 300)  
  
left\_const <- matrix(c(1, 1, 1, 0, 0, 0, 0, 0, 0,  
 0, 0, 0, 1, 1, 1, 0 ,0, 0,  
 0, 0, 0, 0, 0, 0, 1, 1, 1,  
 20, 15, 12, 0, 0, 0, 0, 0, 0,  
 0, 0, 0, 20, 15, 12, 0, 0, 0,  
 0, 0, 0, 0, 0, 0, 20, 15, 12,  
 1, 0, 0, 1, 0, 0, 1, 0, 0,  
 0, 1, 0, 0, 1, 0, 0, 1, 0,  
 0, 0, 1, 0, 0, 1, 0, 0, 1,  
 900, 900, 900, -750, -750, -750, 0, 0, 0,  
 0, 0, 0, 450, 450, 450, -900, -900, -900,  
 450, 450, 450, 0, 0, 0, -750, -750, -750), nrow = 12, byrow = TRUE)  
  
right\_const <- c(750,  
 900,  
 450,  
 13000,  
 12000,  
 5000,  
 900,  
 1200,  
 750,  
 0,  
 0,  
 0)  
  
signs <- c("<=",  
 "<=",  
 "<=",  
 "<=",  
 "<=",  
 "<=",  
 "<=",  
 "<=",  
 "<=",  
 "=",  
 "=",  
 "=")

lp("max",object\_func,left\_const,signs,right\_const)

## Success: the objective function is 716666.7

lp("max",object\_func,left\_const,signs,right\_const )$solution

## [1] 0.0000 694.4444 0.0000 0.0000 500.0000 333.3333 0.0000 0.0000  
## [9] 416.6667