Transportation problem

Snehitha Anpur

2022-10-15

```
problem= matrix(c(22,14,30,600,100,
16,20,24,625,120,
80,60,70,"-","-"),ncol=5,byrow=TRUE)

colnames(problem)=c("Warehouse 1","Warehouse 2","Warehouse 3","Production cost","Production capacity")
rownames(problem)=c("Plant A","Plant B","Demand")
problem
```

```
##         Warehouse 1 Warehouse 2 Warehouse 3 Production cost Production capacity
## Plant A "22"        "14"        "30"        "600"           "100"
## Plant B "16"        "20"        "24"        "625"           "120"
## Demand  "80"        "60"        "70"        "-"             "-"
```

Min TC = 22x11 + 14x12 + 30x13 + 16x21 + 20x22 + 24x23

Subject to

supply Constraints

x11 + x12 + x13 <= 100

x21 + x22 + x23 <= 120

Demand Constraints

x11 + x21 >= 80

x12 + x22 >= 60

x13 + x23 >= 70

```
library(lpSolve)
costs = matrix(c(622,614,630,0,
                 641,645,649,0), ncol=4, byrow= TRUE)

#Since Production capacity and Demand values are unbalanced, creating dummy column of the value 10

#column names and row names are mentioned as:

colnames(costs) = c("Warehouse 1","Warehouse 2","Warehouse 3","dummy")

rownames(costs) = c("Plant A","Plant 2")

costs
```

```
##         Warehouse 1 Warehouse 2 Warehouse 3 dummy
## Plant A         622         614         630     0
## Plant 2         641         645         649     0
```

```
#Setting up row signs and production capacity values

row.signs= rep("<=",2)
row.rhs= c(100,120)

#setting up column signs and demand values

col.signs=rep(">=",4)
col.rhs=c(80,60,70,10)

#Running lptrans command to find the minimum cost

lptrans <- lp.transport(costs, "min", row.signs, row.rhs, col.signs, col.rhs)

#Variables for the given problem
lptrans$solution
```

```
##      [,1] [,2] [,3] [,4]
## [1,]    0   60   40    0
## [2,]   80    0   30   10
```

```
# Objective function is
lptrans$objval
```

```
## [1] 132790
```

Therefore

x12 = 60

x13 = 40

x21 = 80

x23 = 30

and objective function is 132790