Assignment 3

Chris Hargis

2022-10-16

```
library(lpSolve)
```

Setting up cost matrix

```
cost = matrix(c(622, 614, 630, 641, 645, 649), ncol = 3, byrow = TRUE)
cost
```

```
##      [,1] [,2] [,3]
## [1,]  622  614  630
## [2,]  641  645  649
```

Setting up Constraints

```
plant.signs = rep('<=', 2)
plantcap = (c(100, 120))
warehouse.signs = rep(">=", 3)
warehousedemand = c(80, 60, 70)
```

Assing object variable

```
lptrans = lp.transport(cost,'min', plant.signs, plantcap, warehouse.signs, warehousedemand)
```

Seeing there is a solution

```
lptrans$status
```

```
## [1] 0
```

Displaying the units matrix

```
lptrans$solution
```

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

Seeing the total Transportation cost

```
lptrans$objval
```

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

Dual & Economic Interpretation

Objective Function:

MAX: -100y1 - 120y2 + 80y3 + 60y4 + 70y5

y1 = total number of units produced by plant A

y2 = total number of units produced by plant B

y3 = total number of units produced by Warehouse 1

y4 = total number of units produced by Warehouse 2

y5 = total number of units produced by Warehouse 3

Constraints

-y1 + y3 <= 622

The inverse of y1 + y3 must be less than or equal to the per unit cost of Warehouse 1 by plant A (622). (y1 and y3 stated above)

The same logic applied below following the variables stated above.

-y1 + y4 <= 614

-y1 + y5 <= 630

-y2 + y3 <= 641

-y2 + y4 <= 645

-y2 + y5 <= 649

y1, y2, y3, y4, y5 >= 0