ASSIGNMENT 2

2023-09-25

Summary

It is a linear programming (LP) problem with an objective function and a set of constraints. The objective of LP is to minimize a linear objective function subject to linear constraints.Where the solution consist of : 20 decision variables and 9 constrains. As per assumption theory where supply = demand , so assumption for the problen is maximum production = schedule installation. *The Xij variables represent decision variables, and now trying to find values for these variables that minimize the objective function .Amount produce in month i(1,2,3,4) and month j(1,2,3,4,5).* After solving lp problem shadow price and recuded cost price has been calculated, throught senstivity analysis.

```
library(lpSolveAPI)#package is load
```

```
x<- read.lp("inclass.lp")#create a lp object x
x                       # to display x
```

```
## Model name:
##   a linear program with 20 decision variables and 9 constraints
```

```
solve(x)
```

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

```
get.objective(x)#get objective value
```

```
## [1] 77.3
```

```
get.variables(x)#get values of decision variables
```

```
##  [1] 10 15  0  0  0  0  0  0  5 30  0  0 25  5  0  0  0  0 10  0
```

```
get.constraints(x)## get values of decision variables
```

```
## [1] 25 35 30 10 10 15 25 20 30
```

```
#sensitivity Analysis
get.sensitivity.objex(x)#get shadow price
```

```
## $objfrom
##  [1] -1.000000e+30 -1.000000e+30 -1.000000e+30  1.125000e+00 -1.500000e-02
##  [6]  1.095000e+00  1.110000e+00  1.125000e+00  1.130000e+00 -5.902541e-02
## [11]  1.070000e+00  1.085000e+00 -1.000000e+30  1.115000e+00 -2.500000e-02
## [16]  1.085000e+00  1.100000e+00  1.115000e+00 -1.000000e+30 -1.000000e-02
##
## $objtill
##  [1] 9.9985e+01 1.0950e+00 1.1100e+00 1.0000e+30 1.0000e+30 1.0000e+30
##  [7] 1.0000e+30 1.0000e+30 1.1400e+00 1.0000e-02 1.0000e+30 1.0000e+30
## [13] 1.1000e+00 1.1400e+00 1.0000e+30 1.0000e+30 1.0000e+30 1.0000e+30
## [19] 1.1400e+00 1.0000e+30
##
## $objfromvalue
##  [1] -1e+30 -1e+30  0e+00 -1e+30  0e+00  0e+00  0e+00  5e+00 -1e+30 -1e+30
## [11]  0e+00  0e+00 -1e+30 -1e+30  5e+00  0e+00  0e+00  1e+01 -1e+30  1e+01
##
## $objtillvalue
##  [1] NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA
```

```
get.sensitivity.rhs(x)#get reduced cost
```

```
## $duals
##  [1]  1.080  1.095  1.070  1.085  0.000  0.015  0.030  0.045 -1.095  0.000
## [11]  0.000  0.000  0.000  0.015 98.905  0.000  0.000  0.000  0.000 98.930
## [21] 98.915  0.000  0.000  0.025 98.915 98.900 98.885  0.000  0.010
##
## $dualsfrom
##  [1]  2.5e+01  3.5e+01  3.0e+01  1.0e+01 -1.0e+30  1.5e+01  2.5e+01  2.0e+01
##  [9]  3.0e+01 -1.0e+30 -1.0e+30 -5.0e+00 -1.0e+30 -5.0e+00  0.0e+00  0.0e+00
## [17] -5.0e+00 -1.0e+30 -1.0e+30  0.0e+00  0.0e+00 -1.0e+30 -1.0e+30 -5.0e+00
## [25]  0.0e+00  0.0e+00 -5.0e+00 -1.0e+30 -5.0e+00
##
## $dualstill
##  [1] 2.5e+01 3.5e+01 3.0e+01 1.0e+01 1.0e+30 1.5e+01 2.5e+01 2.0e+01 3.0e+01
## [10] 1.0e+30 1.0e+30 0.0e+00 1.0e+30 0.0e+00 5.0e+00 5.0e+00 5.0e+00 1.0e+30
## [19] 1.0e+30 5.0e+00 5.0e+00 1.0e+30 1.0e+30 5.0e+00 1.0e+01 1.0e+01 1.0e+01
## [28] 1.0e+30 1.0e+01
```