The Transportation Model - Assignment - 2

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Summary

- By implementing the calculated strategy, our objective of minimizing total production and storage costs was achieved, reducing it to $77.3 million.
- Introducing a dummy coefficient of “100” in the objective function was instrumental in achieving the minimum cost.
- The decision variable “Xij” denotes months from 1 (i) to 2 (j), where “i<=j”. The linear equation comprises 20 decision variables and 9 constraints.
- Notably, the decision variables, now expressed numerically, demonstrate specific month-to-month values: X11=10, X12=15, X23=5, X33=20, X34=10, X44=1.

Loaded Required Library

```
library(lpSolveAPI)
```

Readed the Northern Airplane lp file

```
x <- read.lp("Northern_Airplane.lp")
x
```

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

Solved the lp model

```
solve(x)
```

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

```
get.objective(x)
```

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

```
get.variables(x)
```

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

```
get.constraints(x)
```

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

```
get.sensitivity.objex(x)
```

```
## $objfrom
##  [1] -1.000000e+30 -4.051286e+16  1.110000e+00  1.125000e+00  1.095000e+00
##  [6]  1.110000e+00  1.125000e+00  1.130000e+00  1.070000e+00  1.085000e+00
## [11] -1.000000e+30  1.115000e+00  1.085000e+00  1.100000e+00  1.115000e+00
## [16] -1.000000e+30 -1.500000e-02 -2.296821e+00 -2.500000e-02 -1.000000e-02
##
## $objtill
##  [1] 9.985e+00 1.095e+00 1.000e+30 1.000e+30 1.000e+30 1.000e+30 1.000e+30
##  [8] 1.140e+00 1.000e+30 1.000e+30 1.100e+00 1.140e+00 1.000e+30 1.000e+30
## [15] 1.000e+30 1.140e+00 1.000e+30 1.000e-02 1.000e+30 1.000e+30
##
## $objfromvalue
##  [1] -1e+30 -1e+30  0e+00 -1e+30  0e+00  0e+00  5e+00 -1e+30  0e+00  0e+00
## [11] -1e+30 -1e+30  0e+00  0e+00  1e+01 -1e+30  0e+00 -1e+30  5e+00  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)
```

```
## $duals
##  [1]  1.095  1.110  1.085  1.100 -0.015  0.000  0.015  0.030 -1.110  0.000
## [11]  0.000  0.000  0.000  8.905  0.000  0.000  0.000  8.930  8.915  0.000
## [21]  0.000 98.915 98.900  8.885  0.000  0.015  0.000  0.025  0.010
##
## $dualsfrom
##  [1]  2.5e+01  3.5e+01  3.0e+01  1.0e+01  1.0e+01 -1.0e+30  2.5e+01  2.0e+01
##  [9]  3.0e+01 -1.0e+30 -1.0e+30 -5.0e+00 -1.0e+30  0.0e+00  0.0e+00 -5.0e+00
## [17] -1.0e+30  0.0e+00  0.0e+00 -1.0e+30 -1.0e+30  0.0e+00  0.0e+00 -5.0e+00
## [25] -1.0e+30 -5.0e+00 -1.0e+30 -5.0e+00 -5.0e+00
##
## $dualstill
##  [1] 2.5e+01 3.5e+01 3.0e+01 1.0e+01 1.0e+01 1.0e+30 2.5e+01 2.0e+01 3.0e+01
## [10] 1.0e+30 1.0e+30 0.0e+00 1.0e+30 5.0e+00 5.0e+00 5.0e+00 1.0e+30 5.0e+00
## [19] 5.0e+00 1.0e+30 1.0e+30 1.0e+01 1.0e+01 1.0e+01 1.0e+30 0.0e+00 1.0e+30
## [28] 5.0e+00 1.0e+01
```