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Inlezen in assignment problems

1. Data set faken (excel/csv bestand)

Mini vliegveld bedenken

1. Data set lezen in python
2. Data set omzetten in constraints en objective functions for lpsolve/cplex (lp bestand)

Lijst omzetten Variabelen, constraint

Objective function

Variables

Constraint

Variables

Later:  
 Mooie grafiekjes

Sensitivity analysis

I = Flight

K = Bay

L = Gate

Objective function1 (z1) Gate Distances, minimize: (i = flight, k = bays)

* P\_i, passengers
* X\_i,k Decision variables
* D\_term,k (distances)

Objective function 2(z2), maximize airline preferences:

* X\_i,k, decision variables, flight i to bay k.
* PREF\_i,k, airline preference,

Objective function 3(z3), combination of penalty values for repositioning U,V,W

* U = towing from set arrival bay to night parking bay
* V = towing from parking to departing bay for night stays
* W = towing for non-night stays
* z4 = a\*z1 + b\*z2
* z5 = a\*z1 + b\*z2 + g\*z3

Objective function 6(z6), minimization of distance between bay and gate

* P\_i, passengers
* Xi,l = decision variable
* D2\_bay\_i,l = distance bay and gate

Objective function 7(z7), maximization of airline preference

* Xi,l = decision variable
* PREF2 = preference airline flight for a gate with number between 0 and 1 (closer to 0 means higher preference)

Objective function 8(z8), sum of all penalty values M

* z9 = delta\*z7 + epsilon\*z6 + eta\*z8

Gate constraint 1: Link DOM flight to DOM gates

Sum of Xi,l = 1 for i=i...max, l = 1,2 if DOMi = 1

Sum of Xi,l = 0 for i = i...max, l = 1,2 if DOMi = 0

Gate constraint 2: ensures flights after 6 pm are not in B or C

Sum of X\_i,l=0 for i = i - max, l = 4,5,7,8,9,10

Bay constraint 1:

Two aircraft (i and j) cannot be assigned to the same bay at the same time. It therefore holds that X\_i,k + X\_j,k <=1 (Either 0 or 1 aircraft parked at bay for two aircraft with conflicting timeslots). T\_i,j is the corresponding matrix where T\_i,j = 1 indicates that two flights have the same time slot.

Bay constraint 2:

Aircraft can only be assigned to bays that are compliant with the aircraft. The sum of X\_i,k for all i and k therefore has to equal 1 for the B\_i,l = 1. B\_i,k is the compliance matrix that entails which aircraft is compliant with which bay, where B\_i,k = 1 denotes compliance.

Bay constraint 3:

Only one bay per aircraft. Sum of all X\_i,k therefore has to equal 1 for k 0 to kmax and all i.

Bay constraint 4:

Aircraft that need fueling need to be assigned to a bay that supports fueling

Robust scheduling measures

15 minutes before and after each flight for departure and bay/gate compliance

**Data needed per flight**

Flight i, Passengers Pi, Arrival time, Departure time, bay/gate compliance of aircraft

4 Gates, ABCD  
Distances? :

Only objective function z1/z2. For now.

Z4 = a z1 + b z2

No overnight stays

All passengers leave aircraft (no transfers)

No bay assignment.

Domestic Gates? Yes, A+B. Gate constraint 2.

Towing? Not yet

Robust scheduling, buffer time 10 minutes before and after added