Summary of Toy Scale Model

November 9, 2018

1 Variable Glossary

A is the set of nodes in the multigraph
D is the constant matrix of shortest path travel costs from row location i to column location j
L_i is the decision variable representing whether or not the supply depot is located at $i \in A$
P is the set of parts to be stocked in order to repair grid elements
h_i is the cost of stocking excess of part i
s_i is the cost of stocking out of part i
C is the set of scenarios to be optimized over
d_{ic} is the demand of part i in scenario c
q_i is the stock quantity of part i

2 Math Model

$$minimize \sum_{c \in C} (\sum_{a \in A} \sum_{i \in A} D_{ia} L_i + \sum_{p \in P} h_p(max(q_p - d_{pc}, 0)) + \sum_{p \in P} s_p(max(0, d_{pc} - q_p)))$$

subject to
$q_i > 0 \quad \forall i \in P$
$L_i \in (0, 1)$
some budget constraint?
some part size/inventory size constraint?

3 Comments

I'm unsure if inventory size is a necessary constraint since inventory holding areas can usually be expanded if it's going to be necessary. Maybe treat it as a cost to do so
I need to figure out multiple depots still, but that's on the to-do list.