This is instructions how to format the AMPL-style data file for input into the algorithm.

Big Ms

Model dependent. Temporary for now. Plan to use algorithm to find values in the future

Sets

N – Nodes in model. Where a possible line can start or stop Each node can have 1 or more supply and/or demand associated with it.

L – Possible lines in model. All legal routes where a line could be built

Parameters

pi – Infrastructure budget. Maximum amount that can be spent yearly on power lines.

uncD – Γ^D Uncertainty budget on demand. Must be in [0,1]. O is no uncertainty, 1 is full uncertainty.

uncS – Γ^E Uncertainty budget on energy supply. Must be in [0,1]. O is no uncertainty, 1 is full uncertainty.

sigma – To convert hours to year. To convert non-building costs to years, and allow comparison to yearly building costs.

MaxLines – Maximum lines that can be built on a single route.

ref – Which node voltage angle to set to 0. Used in a DC power model

Tables

c – Cost to build a line on selected route.

cap – Capacity a single line can transmit on a selected route.

b – Reactance of a line on selected route.

gencost – Cost to generate one unit of energy for selected generator.

shed – Penalty for falling one unit short of a demand at selected demand sink

demmax – Maximum of range of uncertain demands at demand sink.

demmin – Minimum of range of uncertain demands at demand sink.

genmax – Maximum of range of uncertain generation caps at generator.

genmin – Minimum of range of uncertain generation caps at generator.

Example File

```
################################
#Big Ms
################################

# Max of the Duals
param M := 90000000;

#Highest Gen Possible
param Mgen := 9000;

#Highest Demand Possible
param Mdem := 9000;

#Highest Line Capacity
param Mcap := 1000;
#Highest theta difference. 7 since 7 > 2pi
param Mtheta := 7;

#Most that can be transmitted
param Mtran := 90000;

################################
#Sets
################################

# Nodes
set N := 1 2 3 4 5 6 ;

# Possible Lines
set L := (1,2) (1,3) (1,4) (1,5) (1,6)
                    (2,3) (2,4) (2,5) (2,6)
                    (3,4) (3,5) (3,6)
                    (4,5) (4,6)
                    (5,6)
;
```

```
################################
#Params
################################

# Budget
param pi := 300000000;

#Uncertainty in Demand
param uncD := 1;

#Uncertainty in Supply
param uncS := 0;

#Hours in a year
#Multiply this by eta in objective problem
param sigma := 8760;

# Max Lines per connection
param maxLines := 3;

#The node that is the reference
param ref := 1;

################################
#Tables
################################

# Cost of each line (Annual)
param c:=
1 2	7232000		1 3	7337040		1 4	11584800	1 5	3861600		1 6	13129440
2 3	3861600		2 4	7723200		2 5	5985480		2 6	5792400		3 4	11391720
3 5	3861600		3 6	9267840		4 5	12164040	4 6	5792400		5 6	11777880
;

# Capacity of Each Line
param cap:=
1 2	100		1 3	100		1 4	80		1 5	100		1 6	70
2 3	100		2 4	100		2 5	100		2 6	100		3 4	82
3 5	100		3 6	100		4 5	75		4 6	100		5 6	78
;
```

```
#Reactance of each line
param b:=
1 2     500     1 3 500     1 4     500     1 5     500     1 6     500
2 3     500     2 4     500     2 5     500     2 6     500     3 4     500
3 5     500     3 6     500     4 5     500     4 6     500     5 6     500
;
# Generating Costs
param gencost :=
1       15      2       0       3       10      4       0       5       0       6       20
;

#Penalty for Unfufiled Load
param  shed :=
1       112.5   2       115     3       120     4       110     5       112     6       0
;

# Max Demand
param demmax :=
1       96      2       288     3       48      4       192     5       288     6       0
;

# Min Demand
param demmin :=
1       64      2       192     3       32      4       128     5       192     6       0
;

# Max Supply
param supmax :=
1       225     2       000     3       525     4       0       5       0       6       900
;

# Min Supply
param supmin :=
1       75      2       0       3       175     4       0       5       0       6       300
```