Notes on the Powernet Challenge

Syracuse University
EECS

Scoring Function

Energy loss:

$$e_{loss}(t) = \sum_{l=1}^{n} r_l y_l(t)$$

Cost of the energy loss, where $p(t)$ is the marginal price:

$$c_{loss}(t) = e_{loss}(t) p(t) y_l(t)$$

Cost of redispatching power:

$$c_{redispatching}(t) = 2 * e_{redispatch} * \alpha * p(t)$$

where $\alpha \geq 1$ and $2 * e_{redispatch}$ is the difference in power due to redispatching. When one supplier increases power production, another supplier has to decrease in equal amount; they are compensated equally.

Blackout cost:

$$c_{blackout}(t) = Load(t) * \beta * p(t)$$

where $\beta \geq 1$

Suppose a blackout occurs at time t_{end}, and the scenario ends at time T_e. Then the total cost is

$$\sum_{t=1}^{t_{end}} (c_{loss}(t) + c_{redispatching}(t)) + \sum_{t=t_{end}}^{T_e} c_{blackout}(t)$$

An Agent's total score in the competition is the sum of scores over all episodes.