EE491 Homework 9

Due November 6 2020

1) Suppose the fuel costs of two generators are given by

$f_1 = 2\ P_{G1} + 0.04\ P_{G1}*P_{G1}$ with $0 \leq P_{G1} \leq 400$,

$f_2 = 5\ P_{G2} + 0.02\ P_{G2}*P_{G2}$ with $0 \leq P_{G2} \leq 400$,

Solve the economic dispatch when the total demand P_D is 200 MW, 400 MW, 600 MW and 800 MW respectively.

2) Suppose a third generator is brought online in Problem 1 with the cost function,

$f_3 = 6\ P_{G3} + 0.01\ P_{G3}*P_{G3}$ with $0 \leq P_{G3} \leq 400$,

Recompute the dispatch values when the total demand P_D is 200 MW, 600 MW, and 1000 MW respectively.

3) Let us reconsider Problem 1 for the lossy case.

Suppose the losses are known to be

$P_{loss}\ (P_{G1},P_{G2}) = 0.0002\ P_{G1}^2 + 0.00015\ P_{G2}^2$

Resolve the economic dispatch for the two cases when the total demand equals 400 MW and 600 MW respectively.

Assume $\epsilon = 0.1$ MW.