KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

ELECTRICAL ENGINEERING DEPARTMENT

COMPUTER PROJECT 3, EE 556 (071)

For the system given in Computer Project # 1, develop a Real-Coded Genetic Algorithm program to design an intelligent power system stabilizer (RCGAPSS) using $\Delta\omega$ as the control input. Select maximizing the minimum damping ratio as an eigenvalue-based objective function. Develop your source code with 3 different crossover methods and 2 different mutation methods. With your program, investigate the followings: -

a. Compare GA performance with different crossover methods.
b. Compare GA performance with different mutation methods.
c. Effect of population size (Try 20, 40, 60, …)
d. Effect of maximum number of generations (Try 20, 40, 60, …)
e. Effect of crossover probability (Try 0.5, 0.6, 0.7, …)
f. Effect of mutation probability (Try 0.001, 0.005, 0.01, …)
g. Find the optimal design of GAPSS
h. Carry out the eigenvalue analysis of the system with GAPSS. Compare with the classical PSS.
i. Carry out the time-domain simulations for 5 seconds with a 10% pulse input of mechanical torque form 1.0s to 1.1s. Compare the simulation results without PSS and with the classical PSS.

Assume any missing data you may need.

Submission:

Write a formal report that includes the eigenvalue analysis and simulation results. A hardcopy of the program developed must be attached. A softcopy of all materials (report and program) must be e-mailed to mabido@kfupm.edu.sa. All materials are due on November 27, 2007.