National Institute of Technology, Rourkela

CS6475: Soft Computing Laboratory

Assignment-7: Particle Swarm Optimization (PSO)

1. Solve the following minimization problem using PSO by setting the maximum number of iterations to 200, swarm size to 50, w=1, c1=1.5 (Personal Learning Coefficient), c2=2.5 (Global Learning Coefficient) and dimension of **x** (i.e. *n*) to 30.

   Minimize $f(\boldsymbol{x}) = \sum_{i=0}^{n}[x_i^2 - 10\cos(2\pi x_i) + 10]$ with $\boldsymbol{x} = [x_1, x_2 \dots x_n]^T$
   Subjected to $-5.12 \leq x_i \leq 5.12$

   a) Repeat the simulations for 10 independent times and plot the convergence graph for 10 independent simulations. Derive inferences from the convergence plots.
   b) Change the dimension of x to 50 and repeat the simulations for 10 independent times and plot the convergence graph for 10 independent simulations. Derive inferences from the convergence plots.
   c) Set c1=2 and c2=2 and repeat the simulations for 10 independent times and plot the convergence graph for 10 independent simulations. Derive inferences from the convergence plots.
   d) Set the swarm size to 10 and repeat the simulations for 10 independent times and plot the convergence graph for 10 independent simulations. Derive inferences from the convergence plots.