10 – KBC

Name: _____

In the task, we are asked to compute minima of given objective functions using the particle swarm optimization (PSO). State variables are arranged into a swarm of column vectors $\mathbf{x}^{(k)}$. The initial swarm $\mathbf{x}^{(0)}$ is generated randomly and the consecutive swarms $\mathbf{x}^{(k+1)}$ are shifted in space

$$\mathbf{x}_n = \mathbf{x}_n + \Delta t\, \mathbf{v}_n$$

by the velocity

$$\mathbf{v}_n = w\mathbf{v}_n + c_1 r_1 \left[\mathbf{p}_n - \mathbf{x}_n\right] + c_2 r_2 \left[\mathbf{g}_n - \mathbf{x}_n\right]$$

where w is the inertial weight, c_1 and c_2 are scaling factors, r_1 and r_2 are random numbers, $\mathbf{p}_n$ is the personal best and $\mathbf{g}_n$ is the global best.

PSO should be implemented in MATLAB. On the web page:

https://en.wikipedia.org/wiki/Test_functions_for_optimization

two different functions should be selected and the minima in a selected range should be found in a given range.