% clear all

% close all

% clc

%tg=Best\_pos

VarName=xlsread("ekim.xlsx")

VarName1=VarName(:,1);

VarName2=VarName(:,2);

VarName3=VarName(:,3);

VarName4=VarName(:,4);

VarName5=VarName(:,5);

VarName6=VarName(:,6);

nVar = 5;

ub = [1 1 1 1 50]\*2;

lb = [-1 -1 -1 -1 -50]\*2;

fobj = @energyPred;

% Define the PSO's paramters

noP = 1000;

maxIter = 300;

wMax = 0.6;

wMin = 0.2;

c1 = 2;

c2 = 2;

vMax = (ub - lb) .\* 0.2;

vMin = -vMax;

% The PSO algorithm

% Initialize the particles

for k = 1 : noP

Swarm.Particles(k).X = (ub-lb) .\* rand(1,nVar) + lb;

Swarm.Particles(k).V = zeros(1, nVar);

Swarm.Particles(k).PBEST.X = zeros(1,nVar);

Swarm.Particles(k).PBEST.O = inf;

Swarm.GBEST.X = zeros(1,nVar);

Swarm.GBEST.O = inf;

end

% Main loop

for t = 1 : maxIter

% Calcualte the objective value

for k = 1 : noP

currentX = Swarm.Particles(k).X;

for i=1:1:552

v1=VarName3(i);

v2=VarName4(i);

v3=VarName5(i);

v4=VarName6(i);

v5=VarName2(i);

Ecest= fobj(currentX, v1, v2, v3, v4 );

o(i)=(Ecest-VarName2(i))^2;

end

o=sum(o)/552;

Swarm.Particles(k).O = o;

% Update the PBEST

if Swarm.Particles(k).O < Swarm.Particles(k).PBEST.O

Swarm.Particles(k).PBEST.X = currentX;

Swarm.Particles(k).PBEST.O = Swarm.Particles(k).O;

end

% Update the GBEST

if Swarm.Particles(k).O < Swarm.GBEST.O

Swarm.GBEST.X = currentX;

Swarm.GBEST.O = Swarm.Particles(k).O;

end

end

% Update the X and V vectors

w = wMax - t .\* ((wMax - wMin) / maxIter);

for k = 1 : noP

Swarm.Particles(k).V = w .\* Swarm.Particles(k).V + c1 .\* rand(1,nVar) .\* (Swarm.Particles(k).PBEST.X - Swarm.Particles(k).X) ...

+ c2 .\* rand(1,nVar) .\* (Swarm.GBEST.X - Swarm.Particles(k).X);

% Check velocities

index1 = find(Swarm.Particles(k).V > vMax);

index2 = find(Swarm.Particles(k).V < vMin);

Swarm.Particles(k).V(index1) = vMax(index1);

Swarm.Particles(k).V(index2) = vMin(index2);

Swarm.Particles(k).X = Swarm.Particles(k).X + Swarm.Particles(k).V;

% Check positions

index1 = find(Swarm.Particles(k).X > ub);

index2 = find(Swarm.Particles(k).X < lb);

Swarm.Particles(k).X(index1) = ub(index1);

Swarm.Particles(k).X(index2) = lb(index2);

end

outmsg = ['Iteration# ', num2str(t) , ' Swarm.GBEST.O = ' , num2str(Swarm.GBEST.O)];

disp(outmsg);

cgCurve(t) = Swarm.GBEST.O;

end

semilogy(cgCurve);

xlabel('Iteration#')

ylabel('Weight')

%MSE

data=ones(552,2)

Ot=0

for i=1:1:552

Ot=Swarm.GBEST.X(1)\*VarName3(i)+Swarm.GBEST.X(2)\*VarName4(i)+Swarm.GBEST.X(3)\*VarName5(i)+Swarm.GBEST.X(4)\*VarName6(i)+Swarm.GBEST.X(5);

Otorj=0.0323\*VarName3(i)+1.66297\*VarName4(i)+(-0.1793)\*VarName5(i)+(0.4071)\*VarName6(i)-47.46;

Otn(i)=Ot;

Otnorj(i)=Otorj;

%data(i)=ot(i) VarName2(i)]

mse(i)=(Ot-VarName2(i))^2;

mseorj(i)=(Otorj-VarName2(i))^2;

end

sum(mse)/552

sum(mseorj)/552

((mean(Otn)).^2)/((mean(Otnorj)).^2)

plot(Otn,'o')

hold on

plot(VarName2)

Swarm.GBEST.X

%Best\_pos

%tg