%GENETIC ALGORITHM%

%Pembangkitan Populasi dan Parameter

clear all;

clc;

load ('propco2egr.mat')

Npop = 200; %populasi

Maxit = 50; %iterasi

el = 0.9; %elatism

Pc = 0.8; %probabilitas crossover

Pm = 0.01; %probabilitas mutasi

Nbit = 20; %jumlah bit

%Constrain

eBangkit = [];

Individu = [];

eIndividu = [];

david = [];

Dadatfit = [];

Datfit = [];

summary = [];

eDadatfit = [];

efitnessmax = [];

eIndividuMax = [];

Bangkit = round(rand(Npop,Nbit\*Dimension));

popsize = size(Bangkit,1);

for i = 1:Dimension

batas(i) = UB(i)-LB(i);

end

for i =1:Npop

for j = 1:Dimension

Desimal(i,j) = bi2de(Bangkit(i,((j\*Nbit)-(Nbit-1)):(j\*Nbit)),'left-msb');

Individu(i,j) = (Desimal(i,j)\*batas(:,j)-batas(:,j)+LB(:,j)\*(2^Nbit-1))/(2^Nbit-1);

end

end

Datfit = [];

variabel = [];

for i = 1:size(Individu,1)

fitness = fobjco2egr(Individu(i,:));

Datfit = [Datfit;fitness];

[fitemax,nmax]=max(Datfit);

end

Dadatfit = [];

for generasi=1:Maxit

disp('GA processing')

clear command windows

clear command history

clear memory

if generasi > 1

sort\_fit = sortrows(sort,Nbit\*Dimension+1);

Individu1 = sort\_fit(round((1-el)\*Npop+1):Npop,:);

remain = sort\_fit(round(el\*Npop)+1:Npop,:);

X = Individu1;

M = size(X,1);

sumfitness = sum(Datfit);

for i=1:M

Prob(i) = Datfit(i)/sumfitness;

end

for i=2:M

Prob(i) = Prob(i)+Prob(i-1);

end

for i=1:M

n=rand;

k=1;

for j=1:M-1

if (n>Prob(j))

k=j+1;

end

end

Xparents(i,:) = X(k,:);

end

%Crossover

[M,d] = size(Xparents);

Xcrossed = Xparents;

for i=1:2:M-1

c=rand;

if (c<=Pc)

p=ceil((d-1)\*rand);

Xcrossed(i,:) = [Xparents(i,1:p) Xparents(i+1,p+1:d)];

Xcrossed(i+1,:) = [Xparents(i+1,1:p) Xparents(i,p+1:d)];

end

end

if (M/2~=floor(M/2))

c=rand;

if (c<=Pc)

p=ceil((d-1)\*rand);

str=ceil((M-1)\*rand);

Xcrossed(M,:) = [Xparents(M,1:p) Xparents(str,p+1:d)]; %the first child is chosen

end

end

%Mutasi

[M,d] = size(Xcrossed);

Xnew=Xcrossed;

for i=1:M

for j=1:d

p=rand;

if (p<=Pm)

Xnew(i,j)=1-Xcrossed(i,j);

end

end

end

disp('New fitness calculation');

Bangkit = [Xnew(:,1:Nbit\*Dimension);remain(:,1:Nbit\*Dimension)];

end

eBangkit = [eBangkit; Bangkit];

for i =1:Npop

for j = 1:Dimension;

Desimal(i,j) = bi2de(Bangkit(i,((j\*Nbit)-(Nbit-1)):(j\*Nbit)),'left-msb');

Individu(i,j) = (Desimal(i,j)\*batas(:,j)-batas(:,j)+LB(:,j)\*(2^Nbit-1))/(2^Nbit-1);

end

end

Datfit = [];

for i = 1:Npop

fitness = fobjco2egr(Individu(i,:));

Datfit = [Datfit;fitness];

[fitemax,nmax] = max(Datfit);

end

Dadatfit = Datfit;

eDadatfit = [eDadatfit;Dadatfit];

eIndividu = [eIndividu;Individu];

[fitnessmax,nmax] = max(eDadatfit);

efitnessmax = [efitnessmax;fitnessmax];

BangkitMax = eBangkit(nmax,:);

IndividuMax = eIndividu(nmax,:);

eIndividuMax = [eIndividuMax;IndividuMax];

BangkitMaxlast = BangkitMax;

schedmax = BangkitMax;

sort = [Bangkit Dadatfit];

summary = [summary; sort];

david = [david; Dadatfit];

clc

max\_variable\_design=IndividuMax(1,:)

max\_objective\_function=fitness(1,:)

disp(num2str(IndividuMax,'%.4f'))

disp(num2str(fitness,'%.2f'))

figure(gcf)

xlabel('Iteration Number')

ylabel('Objective Function')

hold on

grid on

plot(efitnessmax, 'DisplayName', 'efitnessmax', 'YDataSource', 'efitnessmax');

semilogy(efitnessmax,'LineWidth',2);

hold on

end

save ('GAalone.mat')