**LAMPIRAN B**

**SENARAI PROGRAM**

**awal\_gui**

function varargout = awal(varargin)

gui\_Singleton = 1;

gui\_State = struct('gui\_Name', mfilename, ...

'gui\_Singleton', gui\_Singleton, ...

'gui\_OpeningFcn', @awal\_OpeningFcn, ...

'gui\_OutputFcn', @awal\_OutputFcn, ...

'gui\_LayoutFcn', [] , ...

'gui\_Callback', []);

if nargin && ischar(varargin{1})

gui\_State.gui\_Callback = str2func(varargin{1});

end

if nargout

[varargout{1:nargout}] = gui\_mainfcn(gui\_State, varargin{:});

else

gui\_mainfcn(gui\_State, varargin{:});

end

function awal\_OpeningFcn(hObject, eventdata, handles, varargin)

handles.output = hObject;

guidata(hObject, handles);

function varargout = awal\_OutputFcn(hObject, eventdata, handles)

varargout{1} = handles.output;

function axes1\_CreateFcn(hObject, eventdata, handles)

imshow('undip.jpg');

function pushbutton1\_Callback(hObject, eventdata, handles)

open('pso\_gui.m');

run('pso\_gui');

**pso\_gui**

function varargout = pso\_gui(varargin)

gui\_Singleton = 1;

gui\_State = struct('gui\_Name', mfilename, ...

'gui\_Singleton', gui\_Singleton, ...

'gui\_OpeningFcn', @pso\_gui\_OpeningFcn, ...

'gui\_OutputFcn', @pso\_gui\_OutputFcn, ...

'gui\_LayoutFcn', [] , ...

'gui\_Callback', []);

if nargin && ischar(varargin{1})

gui\_State.gui\_Callback = str2func(varargin{1});

end

if nargout

[varargout{1:nargout}] = gui\_mainfcn(gui\_State, varargin{:});

else

gui\_mainfcn(gui\_State, varargin{:});

end

function pso\_gui\_OpeningFcn(hObject, eventdata, handles, varargin)

handles.output = hObject;

guidata(hObject, handles);

function varargout = pso\_gui\_OutputFcn(hObject, eventdata, handles)

varargout{1} = handles.output;

function edit1\_Callback(hObject, eventdata, handles)

function edit1\_CreateFcn(hObject, eventdata, handles)

if ispc && isequal(get(hObject,'BackgroundColor'), get(0,'defaultUicontrolBackgroundColor'))

set(hObject,'BackgroundColor','white');

end

function edit2\_Callback(hObject, eventdata, handles)

function edit2\_CreateFcn(hObject, eventdata, handles)

if ispc && isequal(get(hObject,'BackgroundColor'), get(0,'defaultUicontrolBackgroundColor'))

set(hObject,'BackgroundColor','white');

end

function edit3\_Callback(hObject, eventdata, handles)

function edit3\_CreateFcn(hObject, eventdata, handles)

if ispc && isequal(get(hObject,'BackgroundColor'), get(0,'defaultUicontrolBackgroundColor'))

set(hObject,'BackgroundColor','white');

end

function edit4\_Callback(hObject, eventdata, handles)

function edit4\_CreateFcn(hObject, eventdata, handles)

if ispc && isequal(get(hObject,'BackgroundColor'), get(0,'defaultUicontrolBackgroundColor'))

set(hObject,'BackgroundColor','white');

end

function edit5\_Callback(hObject, eventdata, handles)

function edit5\_CreateFcn(hObject, eventdata, handles)

if ispc && isequal(get(hObject,'BackgroundColor'), get(0,'defaultUicontrolBackgroundColor'))

set(hObject,'BackgroundColor','white');

end

function pushbutton1\_Callback(hObject, eventdata, handles)

iterasi=50;

Pdemand=str2num(get(handles.edit1,'String'));

if (Pdemand < 30000) || (Pdemand > 315000)

msgbox('Daya harus diantara 30000-315000 KiloWatt','Warning','warn');return;

end

h\_selectedRadioButton = get(handles.uipanel2,'SelectedObject');

selectedRadioTag = get(h\_selectedRadioButton,'Tag')

switch selectedRadioTag

case 'radiobutton1'

if (Pdemand>=30000) && (Pdemand<=60000)

[flag,F1,F2,F3]=satu\_unit\_60(Pdemand);

switch flag

case 1

set(handles.edit2,'String',num2str(Pdemand));

set(handles.edit3,'String','0');

set(handles.edit4,'String','0');

set(handles.edit5,'String',num2str(F1));

cla;

case 2

set(handles.edit3,'String',num2str(Pdemand));

set(handles.edit2,'String','0');

set(handles.edit4,'String','0');

set(handles.edit5,'String',num2str(F2));

cla;

case 3

set(handles.edit4,'String',num2str(Pdemand));

set(handles.edit2,'String','0');

set(handles.edit3,'String','0');

set(handles.edit5,'String',num2str(F3));

cla;

end

end

if (Pdemand > 60000) && (Pdemand <= 90000)

[flag,F1,F2,F3]=satu\_unit\_60(Pdemand);

[Gb\_12,Fm\_12,Fm\_all\_12,stop\_12]=pso\_12(Pdemand);

[Gb\_13,Fm\_13,Fm\_all\_13,stop\_13]=pso\_13(Pdemand);

[Gb\_23,Fm\_23,Fm\_all\_23,stop\_23]=pso\_23(Pdemand);

Ct=[F1 F2 F3 Fm\_12 Fm\_13 Fm\_23];

min\_Ct=min(Ct);

if min\_Ct == F1

set(handles.edit2,'String',num2str(Pdemand));

set(handles.edit3,'String','0');

set(handles.edit4,'String','0');

set(handles.edit5,'String',num2str(F1));

cla;

else if min\_Ct == F2

set(handles.edit3,'String',num2str(Pdemand));

set(handles.edit2,'String','0');

set(handles.edit4,'String','0');

set(handles.edit5,'String',num2str(F2));

cla;

else if min\_Ct == F3

set(handles.edit4,'String',num2str(Pdemand));

set(handles.edit2,'String','0');

set(handles.edit3,'String','0');

set(handles.edit5,'String',num2str(F3));

cla;

else if min\_Ct == Fm\_12

set(handles.edit2,'String',num2str(Gb\_12(1,1)));

set(handles.edit3,'String',num2str(Gb\_12(1,2)));

set(handles.edit5,'String',num2str(Fm\_12));

set(handles.edit4,'String','0');

sbx=[1:stop\_12];

plot(handles.axes1,sbx,cell2mat(Fm\_all\_12),'Color','blue','LineWidth',2);

grid on;

xlabel('iterasi ke');

ylabel('Liter/jam');

else if min\_Ct == Fm\_13

set(handles.edit2,'String',num2str(Gb\_13(1,1)));

set(handles.edit4,'String',num2str(Gb\_13(1,2)));

set(handles.edit5,'String',num2str(Fm\_13));

set(handles.edit3,'String','0');

sbx=[1:stop\_13];

plot(handles.axes1,sbx,cell2mat(Fm\_all\_13),'Color','blue','LineWidth',2);

grid on;

xlabel('iterasi ke');

ylabel('Liter/jam');

else if min\_Ct == Fm\_23

set(handles.edit3,'String',num2str(Gb\_23(1,1)));

set(handles.edit4,'String',num2str(Gb\_23(1,2)));

set(handles.edit5,'String',num2str(Fm\_23));

set(handles.edit2,'String','0');

sbx=[1:stop\_23];

plot(handles.axes1,sbx,cell2mat(Fm\_all\_23),'Color','blue','LineWidth',2)

grid on;

xlabel('iterasi ke');

ylabel('Liter/jam');

end

end

end

end

end

end

end

if (Pdemand > 90000) && (Pdemand <= 105000)

[flag,F1,F2,F3]=satu\_unit\_60(Pdemand);

[Gb\_12,Fm\_12,Fm\_all\_12,stop\_12]=pso\_12(Pdemand);

[Gb\_13,Fm\_13,Fm\_all\_13,stop\_13]=pso\_13(Pdemand);

[Gb\_23,Fm\_23,Fm\_all\_23,stop\_23]=pso\_23(Pdemand);

[Gb,Fm,Fm\_all,stop]=pso(Pdemand);

Ct=[F1 F2 F3 Fm\_12 Fm\_13 Fm\_23 Fm];

min\_Ct=min(Ct);

if min\_Ct == F1

set(handles.edit2,'String',num2str(Pdemand));

set(handles.edit3,'String','0');

set(handles.edit4,'String','0');

set(handles.edit5,'String',num2str(F1));

cla;

else if min\_Ct == F2

set(handles.edit3,'String',num2str(Pdemand));

set(handles.edit2,'String','0');

set(handles.edit4,'String','0');

set(handles.edit5,'String',num2str(F2));

cla;

else if min\_Ct == F3

set(handles.edit4,'String',num2str(Pdemand));

set(handles.edit2,'String','0');

set(handles.edit3,'String','0');

set(handles.edit5,'String',num2str(F3));

cla;

else if min\_Ct == Fm\_12

set(handles.edit2,'String',num2str(Gb\_12(1,1)));

set(handles.edit3,'String',num2str(Gb\_12(1,2)));

set(handles.edit5,'String',num2str(Fm\_12));

set(handles.edit4,'String','0');

sbx=[1:stop\_12];

plot(handles.axes1,sbx,cell2mat(Fm\_all\_12),'Color','blue','LineWidth',2);

grid on;

xlabel('iterasi ke');

ylabel('Liter/jam');

else if min\_Ct == Fm\_13

set(handles.edit2,'String',num2str(Gb\_13(1,1)));

set(handles.edit4,'String',num2str(Gb\_13(1,2)));

set(handles.edit5,'String',num2str(Fm\_13));

set(handles.edit3,'String','0');

sbx=[1:stop\_13];

plot(handles.axes1,sbx,cell2mat(Fm\_all\_13),'Color','blue','LineWidth',2);

grid on;

xlabel('iterasi ke');

ylabel('Liter/jam');

else if min\_Ct == Fm\_23

set(handles.edit3,'String',num2str(Gb\_23(1,1)));

set(handles.edit4,'String',num2str(Gb\_23(1,2)));

set(handles.edit5,'String',num2str(Fm\_23));

set(handles.edit2,'String','0');

sbx=[1:stop\_23];

plot(handles.axes1,sbx,cell2mat(Fm\_all\_23),'Color','blue','LineWidth',2);

grid on;

xlabel('iterasi ke');

ylabel('Liter/jam');

else if min\_Ct == Fm

set(handles.edit2,'String',num2str(Gb(1,1)));

set(handles.edit3,'String',num2str(Gb(1,2)));

set(handles.edit4,'String',num2str(Gb(1,3)));

set(handles.edit5,'String',num2str(Fm));

sbx=[1:stop];

plot(handles.axes1,sbx,cell2mat(Fm\_all),'Color','blue','LineWidth',2);

grid on;

xlabel('iterasi ke');

ylabel('Liter/jam');

end

end

end

end

end

end

end

end

if (Pdemand > 105000) && (Pdemand <= 210000)

[Gb\_12,Fm\_12,Fm\_all\_12,stop\_12]=pso\_12(Pdemand);

[Gb\_13,Fm\_13,Fm\_all\_13,stop\_13]=pso\_13(Pdemand);

[Gb\_23,Fm\_23,Fm\_all\_23,stop\_23]=pso\_23(Pdemand);

[Gb,Fm,Fm\_all,stop]=pso(Pdemand);

Ct=[Fm\_12 Fm\_13 Fm\_23 Fm];

min\_Ct=min(Ct);

if min\_Ct == Fm\_12

set(handles.edit2,'String',num2str(Gb\_12(1,1)));

set(handles.edit3,'String',num2str(Gb\_12(1,2)));

set(handles.edit5,'String',num2str(Fm\_12));

set(handles.edit4,'String','0');

sbx=[1:stop\_12];

plot(handles.axes1,sbx,cell2mat(Fm\_all\_12),'Color','blue','LineWidth',2);

grid on;

xlabel('iterasi ke');

ylabel('Liter/jam');

else if min\_Ct == Fm\_13

set(handles.edit2,'String',num2str(Gb\_13(1,1)));

set(handles.edit4,'String',num2str(Gb\_13(1,2)));

set(handles.edit5,'String',num2str(Fm\_13));

set(handles.edit3,'String','0');

sbx=[1:stop\_13];

plot(handles.axes1,sbx,cell2mat(Fm\_all\_13),'Color','blue','LineWidth',2);

grid on;

xlabel('iterasi ke');

ylabel('Liter/jam');

else if min\_Ct == Fm\_23

set(handles.edit3,'String',num2str(Gb\_23(1,1)));

set(handles.edit4,'String',num2str(Gb\_23(1,2)));

set(handles.edit5,'String',num2str(Fm\_23));

set(handles.edit2,'String','0');

sbx=[1:stop\_23];

plot(handles.axes1,sbx,cell2mat(Fm\_all\_23),'Color','blue','LineWidth',2);

grid on;

xlabel('iterasi ke');

ylabel('Liter/jam');

else if min\_Ct == Fm

set(handles.edit2,'String',num2str(Gb(1,1)));

set(handles.edit3,'String',num2str(Gb(1,2)));

set(handles.edit4,'String',num2str(Gb(1,3)));

set(handles.edit5,'String',num2str(Fm));

sbx=[1:stop];

plot(handles.axes1,sbx,cell2mat(Fm\_all),'Color','blue','LineWidth',2);

grid on;

xlabel('iterasi ke');

ylabel('Liter/jam');

end

end

end

end

end

if (Pdemand > 210000)

[Gb,Fm,Fm\_all,stop]=pso(Pdemand);

set(handles.edit2,'String',num2str(Gb(1,1)));

set(handles.edit3,'String',num2str(Gb(1,2)));

set(handles.edit4,'String',num2str(Gb(1,3)));

set(handles.edit5,'String',num2str(Fm));

sbx=[1:stop];

plot(handles.axes1,sbx,cell2mat(Fm\_all),'Color','blue','LineWidth',2,'MarkerSize',12,...

'MarkerEdgeColor','k','MarkerFaceColor','g');

grid on;

xlabel('iterasi ke');

ylabel('Liter/jam');

end

%-----------------------------------------------------------------------------------------

case 'radiobutton2'

if (Pdemand>=30000) && (Pdemand<=60000)

[flag,F1,F2,F3]=satu\_unit\_60(Pdemand);

switch flag

case 1

set(handles.edit2,'String',num2str(Pdemand));

set(handles.edit3,'String','0');

set(handles.edit4,'String','0');

set(handles.edit5,'String',num2str(F1));

cla;

case 2

set(handles.edit3,'String',num2str(Pdemand));

set(handles.edit2,'String','0');

set(handles.edit4,'String','0');

set(handles.edit5,'String',num2str(F2));

cla;

case 3

set(handles.edit4,'String',num2str(Pdemand));

set(handles.edit2,'String','0');

set(handles.edit3,'String','0');

set(handles.edit5,'String',num2str(F3));

cla;

end

end

if (Pdemand > 60000) && (Pdemand <= 90000)

[flag,F1,F2,F3]=satu\_unit\_60(Pdemand);

[Fm\_all\_12,Fmin\_12,opt\_12]=algen\_12(Pdemand);

[Fm\_all\_13,Fmin\_13,opt\_13]=algen\_13(Pdemand);

[Fm\_all\_23,Fmin\_23,opt\_23]=algen\_23(Pdemand);

Ct=[F1 F2 F3 Fmin\_12 Fmin\_13 Fmin\_23];

min\_Ct=min(Ct);

if min\_Ct == F1

set(handles.edit2,'String',num2str(Pdemand));

set(handles.edit3,'String','0');

set(handles.edit4,'String','0');

set(handles.edit5,'String',num2str(F1));

cla;

else if min\_Ct == F2

set(handles.edit3,'String',num2str(Pdemand));

set(handles.edit2,'String','0');

set(handles.edit4,'String','0');

set(handles.edit5,'String',num2str(F2));

cla;

else if min\_Ct == F3

set(handles.edit4,'String',num2str(Pdemand));

set(handles.edit2,'String','0');

set(handles.edit3,'String','0');

set(handles.edit5,'String',num2str(F3));

cla;

else if min\_Ct == Fmin\_12

set(handles.edit2,'String',num2str(opt\_12(1,1)));

set(handles.edit3,'String',num2str(opt\_12(1,2)));

set(handles.edit5,'String',num2str(Fmin\_12));

set(handles.edit4,'String','0');

sbx=[1:100];

plot(handles.axes1,sbx,cell2mat(Fm\_all\_12),'Color','blue','LineWidth',2);

grid on;

xlabel('iterasi ke');

ylabel('Liter/jam');

else if min\_Ct == Fmin\_13

set(handles.edit2,'String',num2str(opt\_13(1,1)));

set(handles.edit4,'String',num2str(opt\_13(1,2)));

set(handles.edit5,'String',num2str(Fmin\_13));

set(handles.edit3,'String','0');

sbx=[1:100];

plot(handles.axes1,sbx,cell2mat(Fm\_all\_13),'Color','blue','LineWidth',2);

grid on;

xlabel('iterasi ke');

ylabel('Liter/jam');

else if min\_Ct == Fmin\_23

set(handles.edit3,'String',num2str(opt\_23(1,1)));

set(handles.edit4,'String',num2str(opt\_23(1,2)));

set(handles.edit5,'String',num2str(Fmin\_23));

set(handles.edit2,'String','0');

sbx=[1:100];

plot(handles.axes1,sbx,cell2mat(Fm\_all\_23),'Color','blue','LineWidth',2);

grid on;

xlabel('iterasi ke');

ylabel('Liter/jam');

end

end

end

end

end

end

end

if (Pdemand > 90000) && (Pdemand <= 105000)

[flag,F1,F2,F3]=satu\_unit\_60(Pdemand);

[Fm\_all\_12,Fmin\_12,opt\_12]=algen\_12(Pdemand);

[Fm\_all\_13,Fmin\_13,opt\_13]=algen\_13(Pdemand);

[Fm\_all\_23,Fmin\_23,opt\_23]=algen\_23(Pdemand);

[Fm\_all,Fmin,opt]=algen(Pdemand);

Ct=[F1 F2 F3 Fmin\_12 Fmin\_13 Fmin\_23 Fmin];

min\_Ct=min(Ct);

if min\_Ct == F1

set(handles.edit2,'String',num2str(Pdemand));

set(handles.edit3,'String','0');

set(handles.edit4,'String','0');

set(handles.edit5,'String',num2str(F1));

cla;

else if min\_Ct == F2

set(handles.edit3,'String',num2str(Pdemand));

set(handles.edit2,'String','0');

set(handles.edit4,'String','0');

set(handles.edit5,'String',num2str(F2));

cla;

else if min\_Ct == F3

set(handles.edit4,'String',num2str(Pdemand));

set(handles.edit2,'String','0');

set(handles.edit3,'String','0');

set(handles.edit5,'String',num2str(F3));

cla;

else if min\_Ct == Fmin\_12

set(handles.edit2,'String',num2str(opt\_12(1,1)));

set(handles.edit3,'String',num2str(opt\_12(1,2)));

set(handles.edit5,'String',num2str(Fmin\_12));

set(handles.edit4,'String','0');

sbx=[1:100];

plot(handles.axes1,sbx,cell2mat(Fm\_all\_12),'Color','blue','LineWidth',2);

grid on;

xlabel('iterasi ke');

ylabel('Liter/jam');

else if min\_Ct == Fmin\_13

set(handles.edit2,'String',num2str(opt\_13(1,1)));

set(handles.edit4,'String',num2str(opt\_13(1,2)));

set(handles.edit5,'String',num2str(Fmin\_13));

set(handles.edit3,'String','0');

sbx=[1:100];

plot(handles.axes1,sbx,cell2mat(Fm\_all\_13),'Color','blue','LineWidth',2);

grid on;

xlabel('iterasi ke');

ylabel('Liter/jam');

else if min\_Ct == Fmin\_23

set(handles.edit3,'String',num2str(opt\_23(1,1)));

set(handles.edit4,'String',num2str(opt\_23(1,2)));

set(handles.edit5,'String',num2str(Fmin\_23));

set(handles.edit2,'String','0');

sbx=[1:100];

plot(handles.axes1,sbx,cell2mat(Fm\_all\_23),'Color','blue','LineWidth',2);

grid on;

xlabel('iterasi ke');

ylabel('Liter/jam');

else if min\_Ct == Fmin

set(handles.edit2,'String',num2str(opt(1,1)));

set(handles.edit3,'String',num2str(opt(1,2)));

set(handles.edit4,'String',num2str(opt(1,3)));

set(handles.edit5,'String',num2str(Fmin));

sbx=[1:100];

plot(handles.axes1,sbx,cell2mat(Fm\_all),'Color','blue','LineWidth',2);

grid on;

xlabel('iterasi ke');

ylabel('Liter/jam');

end

end

end

end

end

end

end

end

if (Pdemand > 105000) && (Pdemand <= 210000)

[Fm\_all\_12,Fmin\_12,opt\_12]=algen\_12(Pdemand);

[Fm\_all\_13,Fmin\_13,opt\_13]=algen\_13(Pdemand);

[Fm\_all\_23,Fmin\_23,opt\_23]=algen\_23(Pdemand);

[Fm\_all,Fmin,opt]=algen(Pdemand);

Ct=[Fmin\_12 Fmin\_13 Fmin\_23 Fmin];

min\_Ct=min(Ct);

if min\_Ct == Fmin\_12

set(handles.edit2,'String',num2str(opt\_12(1,1)));

set(handles.edit3,'String',num2str(opt\_12(1,2)));

set(handles.edit5,'String',num2str(Fmin\_12));

set(handles.edit4,'String','0');

sbx=[1:100];

plot(handles.axes1,sbx,cell2mat(Fm\_all\_12),'Color','blue','LineWidth',2);

grid on;

xlabel('iterasi ke');

ylabel('Liter/jam');

else if min\_Ct == Fmin\_13

set(handles.edit2,'String',num2str(opt\_13(1,1)));

set(handles.edit4,'String',num2str(opt\_13(1,2)));

set(handles.edit5,'String',num2str(Fmin\_13));

set(handles.edit3,'String','0');

sbx=[1:100];

plot(handles.axes1,sbx,cell2mat(Fm\_all\_13),'Color','blue','LineWidth',2);

grid on;

xlabel('iterasi ke');

ylabel('Liter/jam');

else if min\_Ct == Fmin\_23

set(handles.edit3,'String',num2str(opt\_23(1,1)));

set(handles.edit4,'String',num2str(opt\_23(1,2)));

set(handles.edit5,'String',num2str(Fmin\_23));

set(handles.edit2,'String','0');

sbx=[1:100];

plot(handles.axes1,sbx,cell2mat(Fm\_all\_23),'Color','blue','LineWidth',2);

grid on;

xlabel('iterasi ke');

ylabel('Liter/jam');

else if min\_Ct == Fmin

set(handles.edit2,'String',num2str(opt(1,1)));

set(handles.edit3,'String',num2str(opt(1,2)));

set(handles.edit4,'String',num2str(opt(1,3)));

set(handles.edit5,'String',num2str(Fmin));

sbx=[1:100];

plot(handles.axes1,sbx,cell2mat(Fm\_all),'Color','blue','LineWidth',2);

grid on;

xlabel('iterasi ke');

ylabel('Liter/jam');

end

end

end

end

end

if (Pdemand > 210000)

[Fm\_all,Fmin,opt]=algen(Pdemand);

set(handles.edit2,'String',num2str(opt(1,1)));

set(handles.edit3,'String',num2str(opt(1,2)));

set(handles.edit4,'String',num2str(opt(1,3)));

set(handles.edit5,'String',num2str(Fmin));

sbx=[1:100];

plot(handles.axes1,sbx,cell2mat(Fm\_all),'Color','blue','LineWidth',2,'MarkerSize',12,...

'MarkerEdgeColor','k','MarkerFaceColor','g');

grid on;

xlabel('iterasi ke');

ylabel('Liter/jam');

end

case 'radiobutton3'

if (Pdemand < 210000) || (Pdemand > 315000)

msgbox('Daya harus diantara 210000-315000 KiloWatt','Warning','warn');return;

end

[Ct,P1,P2,P3]=iterasi\_lambda(Pdemand);

cla;

set(handles.edit2,'String',num2str(P1));

set(handles.edit3,'String',num2str(P2));

set(handles.edit4,'String',num2str(P3));

set(handles.edit5,'String',num2str(Ct));

end

function radiobutton1\_Callback(hObject, eventdata, handles)

cla;

set(handles.edit2,'String','0');

set(handles.edit3,'String','0');

set(handles.edit4,'String','0');

set(handles.edit5,'String','0');

function radiobutton2\_Callback(hObject, eventdata, handles)

cla;

set(handles.edit2,'String','0');

set(handles.edit3,'String','0');

set(handles.edit4,'String','0');

set(handles.edit5,'String','0');

function radiobutton3\_Callback(hObject, eventdata, handles)

cla;

set(handles.edit2,'String','0');

set(handles.edit3,'String','0');

set(handles.edit4,'String','0');

set(handles.edit5,'String','0');

**pso**

function [X\_opt,Fmin\_pbest,Fmin\_all,stop]=pso(Pd)

%----------inisialisasi

pop=20;

iterasi=500;

alpha\_1=11539.596;

alpha\_2=16346.351;

alpha\_3=13978.2174;

beta\_1=0.1697564;

beta\_2=0.015187438;

beta\_3=0.11871682;

gamma\_1=1.168e-6;

gamma\_2=2.3297e-6;

gamma\_3=1.3703e-6;

for a=1:pop

[ind]=ind\_gen(30000,105000,2,0,1);

P1=ind(1,1);

P2=ind(2,1);

P3=Pd-(P1+P2);

if (P3 <= 30000)

P3=30000;

end

if (P3 >= 105000)

P3=105000;

end

Pt=P1+P2+P3;

if Pt ~= Pd

Psel=Pd-Pt;

P1=P1+Psel;

if (P1<30000) || (P1>105000)

P1=P1-Psel;

P2=P2+Psel;

end

end

v1\_awal\_min=(30000-10)-P1;

v1\_awal\_max=(105000+10)-P1;

v1\_awal=ind\_gen(v1\_awal\_min,v1\_awal\_max,1,0,1);

v2\_awal\_min=(30000-10)-P2;

v2\_awal\_max=(105000+10)-P2;

v2\_awal=ind\_gen(v2\_awal\_min,v2\_awal\_max,1,0,1);

v3\_awal\_min=(30000-10)-P3;

v3\_awal\_max=(105000+10)-P3;

v3\_awal=ind\_gen(v3\_awal\_min,v3\_awal\_max,1,0,1);

X{a}=[P1 P2 P3];

v\_awal{a}=[v1\_awal v2\_awal v3\_awal];

Pbest{a}=[P1 P2 P3];

end

for b=1:pop

F1=alpha\_1+beta\_1\*(X{1,b}(1,1))+gamma\_1\*((X{1,b}(1,1))^2);

F2=alpha\_2+beta\_2\*(X{1,b}(1,2))+gamma\_2\*((X{1,b}(1,2))^2);

F3=alpha\_3+beta\_3\*(X{1,b}(1,3))+gamma\_3\*((X{1,b}(1,3))^2);

F\_tot{b}=F1+F2+F3;

end

Pmin=min(cell2mat(F\_tot));

for d=1:pop

if Pmin == F\_tot{1,d}

Gbest=X{1,d};

end

end

%----------------mulai iterasi

for c=1:iterasi

c1=2;

c2=2;

w\_max=0.5;

w\_min=0.1;

r1=rand;

r2=rand;

%-------bobot

w=w\_max-((w\_max-w\_min)/500)\*c;

%-------posisi baru

for e=1:pop

v{e}=w\*v\_awal{1,e} + c1\*r1\*(Pbest{1,e}-X{1,e}) + c2\*r2\*(Gbest-X{1,e});

Xj{e}=X{1,e}+v{1,e};

end

%-------cek batas posisi baru

for f=1:pop

for g=1:3

if (Xj{1,f}(1,g) <= 30000)

Pb{f}(g)=30000;

end

if (Xj{1,f}(1,g) >= 105000)

Pb{f}(g)=105000;

end

if (Xj{1,f}(1,g) > 30000) && (Xj{1,f}(1,g) < 105000)

Pb{f}(g)=Xj{1,f}(1,g);

end

end

end

%--------cek jumlah posisi baru

for h=1:pop

Pt2=sum(Pb{1,h});

Pc1{h}=Pb{1,h}(1,1);

Pc2{h}=Pb{1,h}(1,2);

Pc3{h}=Pb{1,h}(1,3);

if Pt2 ~= Pd

Psel2{h}=Pd-Pt2;

Pc1{h}=Pb{1,h}(1,1)+Psel2{1,h};

if (Pc1{1,h}<30000) || (Pc1{1,h}>105000)

Pc1{h}=Pc1{1,h}-Psel2{1,h};

Pc2{h}=Pb{1,h}(1,2)+Psel2{1,h};

end

end

Xb{h}=[Pc1{1,h} Pc2{1,h} Pc3{1,h}];

Pt3{h}=sum(Xb{1,h});

end

for i=1:pop

F1a=alpha\_1+beta\_1\*(Pbest{1,i}(1,1))+gamma\_1\*((Pbest{1,i}(1,1))^2);

F2a=alpha\_2+beta\_2\*(Pbest{1,i}(1,2))+gamma\_2\*((Pbest{1,i}(1,2))^2);

F3a=alpha\_3+beta\_3\*(Pbest{1,i}(1,3))+gamma\_3\*((Pbest{1,i}(1,3))^2);

F\_tota{i}=F1a+F2a+F3a;

F1b=alpha\_1+beta\_1\*(Xb{1,i}(1,1))+gamma\_1\*((Xb{1,i}(1,1))^2);

F2b=alpha\_2+beta\_2\*(Xb{1,i}(1,2))+gamma\_2\*((Xb{1,i}(1,2))^2);

F3b=alpha\_3+beta\_3\*(Xb{1,i}(1,3))+gamma\_3\*((Xb{1,i}(1,3))^2);

F\_totb{i}=F1b+F2b+F3b;

end

%----------Pbest baru

for j=1:pop

if F\_totb{1,j} < F\_tota{1,j}

Pbest\_b{j}=Xb{1,j};

else Pbest\_b{j}=Pbest{1,j};

end

end

%-----------------F tiap iterasi

for k=1:pop

F1\_pbest=alpha\_1+beta\_1\*(Pbest\_b{1,k}(1,1))+gamma\_1\*((Pbest\_b{1,k}(1,1))^2);

F2\_pbest=alpha\_2+beta\_2\*(Pbest\_b{1,k}(1,2))+gamma\_2\*((Pbest\_b{1,k}(1,2))^2);

F3\_pbest=alpha\_3+beta\_3\*(Pbest\_b{1,k}(1,3))+gamma\_3\*((Pbest\_b{1,k}(1,3))^2);

F\_tot\_pbest{k}=F1\_pbest+F2\_pbest+F3\_pbest;

end

Fmin\_pbest=min(cell2mat(F\_tot\_pbest));

for l=1:pop

if Fmin\_pbest==F\_tot\_pbest{1,l}

X\_opt=Pbest\_b{1,l};

X\_opt\_all{c}=X\_opt;

end

end

%---------update posisi,Pbest,Gbest

Fmin\_all{c}=Fmin\_pbest;

X=Xb;

Pbest=Pbest\_b;

Gbest=X\_opt;

%---------stop kriteria

V{c}=var(cell2mat(F\_tot\_pbest));

if V{1,c}< 1

stop=c;

break;

else stop=iterasi;

end

end

**pso\_12**

function [X\_opt,Fmin\_pbest,Fmin\_all,stop]=pso\_12(Pd)

%----------inisialisasi

pop=20;

iterasi=500;

alpha\_1=11539.596;

alpha\_2=16346.351;

alpha\_3=13978.2174;

beta\_1=0.1697564;

beta\_2=0.015187438;

beta\_3=0.11871682;

gamma\_1=1.168e-6;

gamma\_2=2.3297e-6;

gamma\_3=1.3703e-6;

for a=1:pop

[ind]=ind\_gen(30000,105000,1,0,1);

P1=ind(1,1);

P2=Pd-P1;

if (P2 <= 30000)

P2=30000;

end

if (P2 >= 105000)

P2=105000;

end

Pt=P1+P2;

if Pt ~= Pd

Psel=Pd-Pt;

P1=P1+Psel;

if (P1<30000) || (P1>105000)

P1=P1-Psel;

P2=P2+Psel;

end

end

v1\_awal\_min=(30000-10)-P1;

v1\_awal\_max=(105000+10)-P1;

v1\_awal=ind\_gen(v1\_awal\_min,v1\_awal\_max,1,0,1);

v2\_awal\_min=(30000-10)-P2;

v2\_awal\_max=(105000+10)-P2;

v2\_awal=ind\_gen(v2\_awal\_min,v2\_awal\_max,1,0,1);

X{a}=[P1 P2];

v\_awal{a}=[v1\_awal v2\_awal];

Pbest{a}=[P1 P2];

end

for b=1:pop

F1=alpha\_1+beta\_1\*(X{1,b}(1,1))+gamma\_1\*((X{1,b}(1,1))^2);

F2=alpha\_2+beta\_2\*(X{1,b}(1,2))+gamma\_2\*((X{1,b}(1,2))^2);

F\_tot{b}=F1+F2;

end

Pmin=min(cell2mat(F\_tot));

for d=1:pop

if Pmin == F\_tot{1,d}

Gbest=X{1,d};

end

end

%----------------mulai iterasi

for c=1:iterasi

c1=2;

c2=2;

w\_max=0.5;

w\_min=0.1;

r1=rand;

r2=rand;

%-------bobot

w=w\_max-((w\_max-w\_min)/500)\*c;

%-------posisi baru

for e=1:pop

v{e}=w\*v\_awal{1,e} + c1\*r1\*(Pbest{1,e}-X{1,e}) + c2\*r2\*(Gbest-X{1,e});

Xj{e}=X{1,e}+v{1,e};

end

%-------cek batas posisi baru

for f=1:pop

for g=1:2

if (Xj{1,f}(1,g) <= 30000)

Pb{f}(g)=30000;

end

if (Xj{1,f}(1,g) >= 105000)

Pb{f}(g)=105000;

end

if (Xj{1,f}(1,g) > 30000) && (Xj{1,f}(1,g) < 105000)

Pb{f}(g)=Xj{1,f}(1,g);

end

end

end

%--------cek jumlah posisi baru

for h=1:pop

Pt2=sum(Pb{1,h});

Pc1{h}=Pb{1,h}(1,1);

Pc2{h}=Pb{1,h}(1,2);

if Pt2 ~= Pd

Psel2{h}=Pd-Pt2;

Pc1{h}=Pb{1,h}(1,1)+Psel2{1,h};

if (Pc1{1,h}<30000) || (Pc1{1,h}>105000)

Pc1{h}=Pc1{1,h}-Psel2{1,h};

Pc2{h}=Pb{1,h}(1,2)+Psel2{1,h};

end

end

Xb{h}=[Pc1{1,h} Pc2{1,h}];

Pt3{h}=sum(Xb{1,h});

end

for i=1:pop

F1a=alpha\_1+beta\_1\*(Pbest{1,i}(1,1))+gamma\_1\*((Pbest{1,i}(1,1))^2);

F2a=alpha\_2+beta\_2\*(Pbest{1,i}(1,2))+gamma\_2\*((Pbest{1,i}(1,2))^2);

F\_tota{i}=F1a+F2a;

F1b=alpha\_1+beta\_1\*(Xb{1,i}(1,1))+gamma\_1\*((Xb{1,i}(1,1))^2);

F2b=alpha\_2+beta\_2\*(Xb{1,i}(1,2))+gamma\_2\*((Xb{1,i}(1,2))^2);

F\_totb{i}=F1b+F2b;

end

for j=1:pop

%----------Pbest baru

if F\_totb{1,j} < F\_tota{1,j}

Pbest\_b{j}=Xb{1,j};

else Pbest\_b{j}=Pbest{1,j};

end

end

%-----------------F tiap iterasi

for k=1:pop

F1\_pbest=alpha\_1+beta\_1\*(Pbest\_b{1,k}(1,1))+gamma\_1\*((Pbest\_b{1,k}(1,1))^2);

F2\_pbest=alpha\_2+beta\_2\*(Pbest\_b{1,k}(1,2))+gamma\_2\*((Pbest\_b{1,k}(1,2))^2);

F\_tot\_pbest{k}=F1\_pbest+F2\_pbest;

end

Fmin\_pbest=min(cell2mat(F\_tot\_pbest));

for l=1:pop

if Fmin\_pbest==F\_tot\_pbest{1,l}

X\_opt=Pbest\_b{1,l};

X\_opt\_all{c}=X\_opt;

end

end

%---------update posisi,Pbest,Gbest

Fmin\_all{c}=Fmin\_pbest;

X=Xb;

Pbest=Pbest\_b;

Gbest=X\_opt;

%---------stop kriteria

V{c}=var(cell2mat(F\_tot\_pbest));

if V{1,c}< 1

stop=c;

break;

else stop=iterasi;

end

**pso\_13**

function [X\_opt,Fmin\_pbest,Fmin\_all,stop]=pso\_13(Pd)

%----------inisialisasi

pop=20;

iterasi=3;

alpha\_1=11539.596;

alpha\_2=16346.351;

alpha\_3=13978.2174;

beta\_1=0.1697564;

beta\_2=0.015187438;

beta\_3=0.11871682;

gamma\_1=1.168e-6;

gamma\_2=2.3297e-6;

gamma\_3=1.3703e-6;

for a=1:pop

[ind]=ind\_gen(30000,105000,1,0,1);

P1=ind(1,1);

P2=Pd-P1;

if (P2 <= 30000)

P2=30000;

end

if (P2 >= 105000)

P2=105000;

end

Pt=P1+P2;

if Pt ~= Pd

Psel=Pd-Pt;

P1=P1+Psel;

if (P1<30000) || (P1>105000)

P1=P1-Psel;

P2=P2+Psel;

end

end

v1\_awal\_min=(30000-10)-P1;

v1\_awal\_max=(105000+10)-P1;

v1\_awal=ind\_gen(v1\_awal\_min,v1\_awal\_max,1,0,1);

v2\_awal\_min=(30000-10)-P2;

v2\_awal\_max=(105000+10)-P2;

v2\_awal=ind\_gen(v2\_awal\_min,v2\_awal\_max,1,0,1);

X{a}=[P1 P2];

v\_awal{a}=[v1\_awal v2\_awal];

Pbest{a}=[P1 P2];

end

for b=1:pop

F1=alpha\_1+beta\_1\*(X{1,b}(1,1))+gamma\_1\*((X{1,b}(1,1))^2);

F3=alpha\_3+beta\_3\*(X{1,b}(1,2))+gamma\_3\*((X{1,b}(1,2))^2);

F\_tot{b}=F1+F3;

end

Pmin=min(cell2mat(F\_tot));

for d=1:pop

if Pmin == F\_tot{1,d}

Gbest=X{1,d};

end

end

%----------------mulai iterasi

for c=1:iterasi

c1=2;

c2=2;

w\_max=0.5;

w\_min=0.1;

r1=rand;

r2=rand;

%-------bobot

w=w\_max-((w\_max-w\_min)/500)\*c;

%-------posisi baru

for e=1:pop

v{e}=w\*v\_awal{1,e} + c1\*r1\*(Pbest{1,e}-X{1,e}) + c2\*r2\*(Gbest-X{1,e});

Xj{e}=X{1,e}+v{1,e};

end

%-------cek batas posisi baru

for f=1:pop

for g=1:2

if (Xj{1,f}(1,g) <= 30000)

Pb{f}(g)=30000;

end

if (Xj{1,f}(1,g) >= 105000)

Pb{f}(g)=105000;

end

if (Xj{1,f}(1,g) > 30000) && (Xj{1,f}(1,g) < 105000)

Pb{f}(g)=Xj{1,f}(1,g);

end

end

end

%--------cek jumlah posisi baru

for h=1:pop

Pt2=sum(Pb{1,h});

Pc1{h}=Pb{1,h}(1,1);

Pc2{h}=Pb{1,h}(1,2);

if Pt2 ~= Pd

Psel2{h}=Pd-Pt2;

Pc1{h}=Pb{1,h}(1,1)+Psel2{1,h};

end

Xb{h}=[Pc1{1,h} Pc2{1,h}];

Pt3{h}=sum(Xb{1,h});

end

for i=1:pop

F1a=alpha\_1+beta\_1\*(Pbest{1,i}(1,1))+gamma\_1\*((Pbest{1,i}(1,1))^2);

F3a=alpha\_3+beta\_3\*(Pbest{1,i}(1,2))+gamma\_3\*((Pbest{1,i}(1,2))^2);

F\_tota{i}=F1a+F3a;

F1b=alpha\_1+beta\_1\*(Xb{1,i}(1,1))+gamma\_1\*((Xb{1,i}(1,1))^2);

F3b=alpha\_3+beta\_3\*(Xb{1,i}(1,2))+gamma\_3\*((Xb{1,i}(1,2))^2);

F\_totb{i}=F1b+F3b;

end

%----------Pbest baru

for j=1:pop

if F\_totb{1,j} < F\_tota{1,j}

Pbest\_b{j}=Xb{1,j};

else Pbest\_b{j}=Pbest{1,j};

end

end

%-----------------F tiap iterasi

for k=1:pop

F1\_pbest=alpha\_1+beta\_1\*(Pbest\_b{1,k}(1,1))+gamma\_1\*((Pbest\_b{1,k}(1,1))^2);

F3\_pbest=alpha\_3+beta\_3\*(Pbest\_b{1,k}(1,2))+gamma\_3\*((Pbest\_b{1,k}(1,2))^2);

F\_tot\_pbest{k}=F1\_pbest+F3\_pbest;

end

Fmin\_pbest=min(cell2mat(F\_tot\_pbest));

for l=1:pop

if Fmin\_pbest==F\_tot\_pbest{1,l}

X\_opt=Pbest\_b{1,l};

X\_opt\_all{c}=X\_opt;

end

end

%---------update posisi,Pbest,Gbest

Fmin\_all{c}=Fmin\_pbest;

X=Xb;

Pbest=Pbest\_b;

Gbest=X\_opt;

%---------stop kriteria

V{c}=var(cell2mat(F\_tot\_pbest));

if V{1,c}< 1

stop=c;

break;

else stop=iterasi;

end

end

**pso\_23**

function [X\_opt,Fmin\_pbest,Fmin\_all,stop]=pso\_23(Pd)

%----------inisialisasi

pop=20;

iterasi=500;

alpha\_1=11539.596;

alpha\_2=16346.351;

alpha\_3=13978.2174;

beta\_1=0.1697564;

beta\_2=0.015187438;

beta\_3=0.11871682;

gamma\_1=1.168e-6;

gamma\_2=2.3297e-6;

gamma\_3=1.3703e-6;

for a=1:pop

[ind]=ind\_gen(30000,105000,1,0,1);

P1=ind(1,1);

P2=Pd-P1;

if (P2 <= 30000)

P2=30000;

end

if (P2 >= 105000)

P2=105000;

end

Pt=P1+P2;

if Pt ~= Pd

Psel=Pd-Pt;

P1=P1+Psel;

if (P1<30000) || (P1>105000)

P1=P1-Psel;

P2=P2+Psel;

end

end

v1\_awal\_min=(30000-10)-P1;

v1\_awal\_max=(105000+10)-P1;

v1\_awal=ind\_gen(v1\_awal\_min,v1\_awal\_max,1,0,1);

v2\_awal\_min=(30000-10)-P2;

v2\_awal\_max=(105000+10)-P2;

v2\_awal=ind\_gen(v2\_awal\_min,v2\_awal\_max,1,0,1);

X{a}=[P1 P2];

v\_awal{a}=[v1\_awal v2\_awal];

Pbest{a}=[P1 P2];

end

for b=1:pop

F2=alpha\_2+beta\_2\*(X{1,b}(1,1))+gamma\_2\*((X{1,b}(1,1))^2);

F3=alpha\_3+beta\_3\*(X{1,b}(1,2))+gamma\_3\*((X{1,b}(1,2))^2);

F\_tot{b}=F2+F3;

end

Pmin=min(cell2mat(F\_tot));

for d=1:pop

if Pmin == F\_tot{1,d}

Gbest=X{1,d};

end

end

%----------------mulai iterasi

for c=1:iterasi

c1=2;

c2=2;

w\_max=0.5;

w\_min=0.1;

r1=rand;

r2=rand;

%-------bobot

w=w\_max-((w\_max-w\_min)/500)\*c;

%-------posisi baru

for e=1:pop

v{e}=w\*v\_awal{1,e} + c1\*r1\*(Pbest{1,e}-X{1,e}) + c2\*r2\*(Gbest-X{1,e});

Xj{e}=X{1,e}+v{1,e};

end

%-------cek batas posisi baru

for f=1:pop

for g=1:2

if (Xj{1,f}(1,g) <= 30000)

Pb{f}(g)=30000;

end

if (Xj{1,f}(1,g) >= 105000)

Pb{f}(g)=105000;

end

if (Xj{1,f}(1,g) > 30000) && (Xj{1,f}(1,g) < 105000)

Pb{f}(g)=Xj{1,f}(1,g);

end

end

end

%--------cek jumlah posisi baru

for h=1:pop

Pt2=sum(Pb{1,h});

Pc1{h}=Pb{1,h}(1,1);

Pc2{h}=Pb{1,h}(1,2);

if Pt2 ~= Pd

Psel2{h}=Pd-Pt2;

Pc1{h}=Pb{1,h}(1,1)+Psel2{1,h};

if (Pc1{1,h}<30000) || (Pc1{1,h}>105000)

Pc1{h}=Pc1{1,h}-Psel2{1,h};

Pc2{h}=Pb{1,h}(1,2)+Psel2{1,h};

end

end

Xb{h}=[Pc1{1,h} Pc2{1,h}];

Pt3{h}=sum(Xb{1,h});

end

for i=1:pop

F2a=alpha\_2+beta\_2\*(Pbest{1,i}(1,1))+gamma\_2\*((Pbest{1,i}(1,1))^2);

F3a=alpha\_3+beta\_3\*(Pbest{1,i}(1,2))+gamma\_3\*((Pbest{1,i}(1,2))^2);

F\_tota{i}=F2a+F3a;

F2b=alpha\_2+beta\_2\*(Xb{1,i}(1,1))+gamma\_2\*((Xb{1,i}(1,1))^2);

F3b=alpha\_3+beta\_3\*(Xb{1,i}(1,2))+gamma\_3\*((Xb{1,i}(1,2))^2);

F\_totb{i}=F2b+F3b;

end

%----------Pbest baru

for j=1:pop

if F\_totb{1,j} < F\_tota{1,j}

Pbest\_b{j}=Xb{1,j};

else Pbest\_b{j}=Pbest{1,j};

end

end

%-----------------F tiap iterasi

for k=1:pop

F2\_pbest=alpha\_2+beta\_2\*(Pbest\_b{1,k}(1,1))+gamma\_2\*((Pbest\_b{1,k}(1,1))^2);

F3\_pbest=alpha\_3+beta\_3\*(Pbest\_b{1,k}(1,2))+gamma\_3\*((Pbest\_b{1,k}(1,2))^2);

F\_tot\_pbest{k}=F2\_pbest+F3\_pbest;

end

Fmin\_pbest=min(cell2mat(F\_tot\_pbest));

for l=1:pop

if Fmin\_pbest==F\_tot\_pbest{1,l}

X\_opt=Pbest\_b{1,l};

X\_opt\_all{c}=X\_opt;

end

end

%---------update posisi,Pbest,Gbest

Fmin\_all{c}=Fmin\_pbest;

X=Xb;

Pbest=Pbest\_b;

Gbest=X\_opt;

%---------stop kriteria

V{c}=var(cell2mat(F\_tot\_pbest));

if V{1,c}< 1

stop=c;

break;

else stop=iterasi;

end

end

**algen**

function [Fmin\_all,Fmin\_akhir,ind\_opt]=algen(Pd)

%----------inisialisasi

pop=10;

iterasi=100;

alpha\_1=11539.596;

alpha\_2=16346.351;

alpha\_3=13978.2174;

beta\_1=0.1697564;

beta\_2=0.015187438;

beta\_3=0.11871682;

gamma\_1=1.168e-6;

gamma\_2=2.3297e-6;

gamma\_3=1.3703e-6;

for a=1:pop

[ind]=ind\_gen(30000,105000,2,0,1);

P1=ind(1,1);

P2=ind(2,1);

P3=Pd-(P1+P2);

if (P3 <= 30000)

P3=30000;

end

if (P3 >= 105000)

P3=105000;

end

Pt=P1+P2+P3;

if Pt ~= Pd

Psel=Pd-Pt;

P1=P1+Psel;

if (P1<30000) || (P1>105000)

P1=P1-Psel;

P2=P2+Psel;

end

end

X{a}=[P1 P2 P3];

end

%--------------------mulai iterasi

for c=1:iterasi

%----------mutasi

for d=1:pop

idx=randint(pop,1,[1,pop]);

X\_mut{d}=X{1,idx(1,1)}+0.1\*(X{1,idx(2,1)}-X{1,idx(3,1)});

end

%---------crossover

for e=1:pop

k\_cross=0.5;

acak=rand;

if acak <= k\_cross

X\_cross{e}=X\_mut{1,e};

else X\_cross{e}=X{1,e};

end

end

%-------cek batas individu baru

for f=1:pop

for g=1:3

if (X\_cross{1,f}(1,g) <= 30000)

Pb{f}(g)=30000;

end

if (X\_cross{1,f}(1,g) >= 105000)

Pb{f}(g)=105000;

end

if (X\_cross{1,f}(1,g) > 30000) && (X\_cross{1,f}(1,g) < 105000)

Pb{f}(g)=X\_cross{1,f}(1,g);

end

end

end

%--------cek jumlah individu baru

for h=1:pop

Pt2=sum(Pb{1,h});

Pc1{h}=Pb{1,h}(1,1);

Pc2{h}=Pb{1,h}(1,2);

Pc3{h}=Pb{1,h}(1,3);

if Pt2 ~= Pd

Psel2{h}=Pd-Pt2;

Pc1{h}=Pb{1,h}(1,1)+Psel2{1,h};

if (Pc1{1,h}<30000) || (Pc1{1,h}>105000)

Pc1{h}=Pc1{1,h}-Psel2{1,h};

Pc2{h}=Pb{1,h}(1,2)+Psel2{1,h};

if (Pc2{1,h}<30000) || (Pc2{1,h}>105000)

Pc2{h}=Pc2{1,h}-Psel2{1,h};

Pc3{h}=Pb{1,h}(1,3)+Psel2{1,h};

end

end

end

Xb{h}=[Pc1{1,h} Pc2{1,h} Pc3{1,h}];

Pt3{h}=sum(Xb{1,h});

end

for i=1:pop

F1a=alpha\_1+beta\_1\*(X{1,i}(1,1))+gamma\_1\*((X{1,i}(1,1))^2);

F2a=alpha\_2+beta\_2\*(X{1,i}(1,2))+gamma\_2\*((X{1,i}(1,2))^2);

F3a=alpha\_3+beta\_3\*(X{1,i}(1,3))+gamma\_3\*((X{1,i}(1,3))^2);

F\_tota{i}=F1a+F2a+F3a;

F1b=alpha\_1+beta\_1\*(Xb{1,i}(1,1))+gamma\_1\*((Xb{1,i}(1,1))^2);

F2b=alpha\_2+beta\_2\*(Xb{1,i}(1,2))+gamma\_2\*((Xb{1,i}(1,2))^2);

F3b=alpha\_3+beta\_3\*(Xb{1,i}(1,3))+gamma\_3\*((Xb{1,i}(1,3))^2);

F\_totb{i}=F1b+F2b+F3b;

end

%----------Seleksi

for j=1:pop

if F\_totb{1,j} < F\_tota{1,j}

X\_sel{j}=Xb{1,j};

else X\_sel{j}=X{1,j};

end

end

X=X\_sel;

%---------F akhir

for k=1:pop

F1\_akhir=alpha\_1+beta\_1\*(X{1,k}(1,1))+gamma\_1\*((X{1,k}(1,1))^2);

F2\_akhir=alpha\_2+beta\_2\*(X{1,k}(1,2))+gamma\_2\*((X{1,k}(1,2))^2);

F3\_akhir=alpha\_3+beta\_3\*(X{1,k}(1,3))+gamma\_3\*((X{1,k}(1,3))^2);

F\_tot\_akhir{k}=F1\_akhir+F2\_akhir+F3\_akhir;

end

Fmin\_akhir=min(cell2mat(F\_tot\_akhir));

for l=1:pop

if Fmin\_akhir == F\_tot\_akhir{1,l}

ind\_opt=X{1,l};

end

end

Fmin\_all{c}=Fmin\_akhir;

ind\_opt\_all{c}= ind\_opt;

end

**algen\_12**

function [Fmin\_all,Fmin\_akhir,ind\_opt]=algen\_12(Pd)

%----------inisialisasi

pop=10;

iterasi=100;

alpha\_1=11539.596;

alpha\_2=16346.351;

alpha\_3=13978.2174;

beta\_1=0.1697564;

beta\_2=0.015187438;

beta\_3=0.11871682;

gamma\_1=1.168e-6;

gamma\_2=2.3297e-6;

gamma\_3=1.3703e-6;

for a=1:pop

[ind]=ind\_gen(30000,105000,1,0,1);

P1=ind(1,1);

P2=Pd-P1;

if (P2 <= 30000)

P2=30000;

end

if (P2 >= 105000)

P2=105000;

end

Pt=P1+P2;

if Pt ~= Pd

Psel=Pd-Pt;

P1=P1+Psel;

if (P1<30000) || (P1>105000)

P1=P1-Psel;

P2=P2+Psel;

end

end

X{a}=[P1 P2];

end

%---------------------mulai iterasi

for c=1:iterasi

%----------mutasi

for d=1:pop

idx=randint(pop,1,[1,pop]);

X\_mut{d}=X{1,idx(1,1)}+0.1\*(X{1,idx(2,1)}-X{1,idx(3,1)});

end

%---------crossover

for e=1:pop

k\_cross=0.5;

acak=rand;

if acak <= k\_cross

X\_cross{e}=X\_mut{1,e};

else X\_cross{e}=X{1,e};

end

end

%-------cek batas individu baru

for f=1:pop

for g=1:2

if (X\_cross{1,f}(1,g) <= 30000)

Pb{f}(g)=30000;

end

if (X\_cross{1,f}(1,g) >= 105000)

Pb{f}(g)=105000;

end

if (X\_cross{1,f}(1,g) > 30000) && (X\_cross{1,f}(1,g) < 105000)

Pb{f}(g)=X\_cross{1,f}(1,g);

end

end

end

%--------cek jumlah individu baru

for h=1:pop

Pt2=sum(Pb{1,h});

Pc1{h}=Pb{1,h}(1,1);

Pc2{h}=Pb{1,h}(1,2);

if Pt2 ~= Pd

Psel2{h}=Pd-Pt2;

Pc1{h}=Pb{1,h}(1,1)+Psel2{1,h};

if (Pc1{1,h}<30000) || (Pc1{1,h}>105000)

Pc1{h}=Pc1{1,h}-Psel2{1,h};

Pc2{h}=Pb{1,h}(1,2)+Psel2{1,h};

end

end

Xb{h}=[Pc1{1,h} Pc2{1,h}];

Pt3{h}=sum(Xb{1,h});

end

for i=1:pop

F1a=alpha\_1+beta\_1\*(X{1,i}(1,1))+gamma\_1\*((X{1,i}(1,1))^2);

F2a=alpha\_2+beta\_2\*(X{1,i}(1,2))+gamma\_2\*((X{1,i}(1,2))^2);

F\_tota{i}=F1a+F2a;

F1b=alpha\_1+beta\_1\*(Xb{1,i}(1,1))+gamma\_1\*((Xb{1,i}(1,1))^2);

F2b=alpha\_2+beta\_2\*(Xb{1,i}(1,2))+gamma\_2\*((Xb{1,i}(1,2))^2);

F\_totb{i}=F1b+F2b;

end

%----------Seleksi

for j=1:pop

if F\_totb{1,j} < F\_tota{1,j}

X\_sel{j}=Xb{1,j};

else X\_sel{j}=X{1,j};

end

end

X=X\_sel;

%---------F akhir

for k=1:pop

F1\_akhir=alpha\_1+beta\_1\*(X{1,k}(1,1))+gamma\_1\*((X{1,k}(1,1))^2);

F2\_akhir=alpha\_2+beta\_2\*(X{1,k}(1,2))+gamma\_2\*((X{1,k}(1,2))^2);

F\_tot\_akhir{k}=F1\_akhir+F2\_akhir;

end

Fmin\_akhir=min(cell2mat(F\_tot\_akhir));

for l=1:pop

if Fmin\_akhir == F\_tot\_akhir{1,l}

ind\_opt=X{1,l};

end

end

Fmin\_all{c}=Fmin\_akhir;

ind\_opt\_all{c}= ind\_opt;

end

**algen\_13**

function [Fmin\_all,Fmin\_akhir,ind\_opt]=algen\_13(Pd)

%----------inisialisasi

pop=10;

iterasi=100;

alpha\_1=11539.596;

alpha\_2=16346.351;

alpha\_3=13978.2174;

beta\_1=0.1697564;

beta\_2=0.015187438;

beta\_3=0.11871682;

gamma\_1=1.168e-6;

gamma\_2=2.3297e-6;

gamma\_3=1.3703e-6;

for a=1:pop

[ind]=ind\_gen(30000,105000,1,0,1);

P1=ind(1,1);

P2=Pd-P1;

if (P2 <= 30000)

P2=30000;

end

if (P2 >= 105000)

P2=105000;

end

Pt=P1+P2;

if Pt ~= Pd

Psel=Pd-Pt;

P1=P1+Psel;

if (P1<30000) || (P1>105000)

P1=P1-Psel;

P2=P2+Psel;

end

end

X{a}=[P1 P2];

end

%--------------------mulai iterasi

for c=1:iterasi

%----------mutasi

for d=1:pop

idx=randint(pop,1,[1,pop]);

X\_mut{d}=X{1,idx(1,1)}+0.1\*(X{1,idx(2,1)}-X{1,idx(3,1)});

end

%---------crossover

for e=1:pop

k\_cross=0.5;

acak=rand;

if acak <= k\_cross

X\_cross{e}=X\_mut{1,e};

else X\_cross{e}=X{1,e};

end

end

%-------cek batas individu baru

for f=1:pop

for g=1:2

if (X\_cross{1,f}(1,g) <= 30000)

Pb{f}(g)=30000;

end

if (X\_cross{1,f}(1,g) >= 105000)

Pb{f}(g)=105000;

end

if (X\_cross{1,f}(1,g) > 30000) && (X\_cross{1,f}(1,g) < 105000)

Pb{f}(g)=X\_cross{1,f}(1,g);

end

end

end

%--------cek jumlah individu baru

for h=1:pop

Pt2=sum(Pb{1,h});

Pc1{h}=Pb{1,h}(1,1);

Pc2{h}=Pb{1,h}(1,2);

if Pt2 ~= Pd

Psel2{h}=Pd-Pt2;

Pc1{h}=Pb{1,h}(1,1)+Psel2{1,h};

if (Pc1{1,h}<30000) || (Pc1{1,h}>105000)

Pc1{h}=Pc1{1,h}-Psel2{1,h};

Pc2{h}=Pb{1,h}(1,2)+Psel2{1,h};

end

end

Xb{h}=[Pc1{1,h} Pc2{1,h}];

Pt3{h}=sum(Xb{1,h});

end

for i=1:pop

F1a=alpha\_1+beta\_1\*(X{1,i}(1,1))+gamma\_1\*((X{1,i}(1,1))^2);

F3a=alpha\_3+beta\_3\*(X{1,i}(1,2))+gamma\_3\*((X{1,i}(1,2))^2);

F\_tota{i}=F1a+F3a;

F1b=alpha\_1+beta\_1\*(Xb{1,i}(1,1))+gamma\_1\*((Xb{1,i}(1,1))^2);

F3b=alpha\_3+beta\_3\*(Xb{1,i}(1,2))+gamma\_3\*((Xb{1,i}(1,2))^2);

F\_totb{i}=F1b+F3b;

end

%----------Seleksi

for j=1:pop

if F\_totb{1,j} < F\_tota{1,j}

X\_sel{j}=Xb{1,j};

else X\_sel{j}=X{1,j};

end

end

X=X\_sel;

%---------F akhir

for k=1:pop

F1\_akhir=alpha\_1+beta\_1\*(X{1,k}(1,1))+gamma\_1\*((X{1,k}(1,1))^2);

F3\_akhir=alpha\_3+beta\_3\*(X{1,k}(1,2))+gamma\_3\*((X{1,k}(1,2))^2);

F\_tot\_akhir{k}=F1\_akhir+F3\_akhir;

end

Fmin\_akhir=min(cell2mat(F\_tot\_akhir));

for l=1:pop

if Fmin\_akhir == F\_tot\_akhir{1,l}

ind\_opt=X{1,l};

end

end

Fmin\_all{c}=Fmin\_akhir;

ind\_opt\_all{c}= ind\_opt;

end

**algen\_23**

function [Fmin\_all,Fmin\_akhir,ind\_opt]=algen\_23(Pd

%----------inisialisasi

pop=10;

iterasi=100;

alpha\_1=11539.596;

alpha\_2=16346.351;

alpha\_3=13978.2174;

beta\_1=0.1697564;

beta\_2=0.015187438;

beta\_3=0.11871682;

gamma\_1=1.168e-6;

gamma\_2=2.3297e-6;

gamma\_3=1.3703e-6;

for a=1:pop

[ind]=ind\_gen(30000,105000,1,0,1);

P1=ind(1,1);

P2=Pd-P1;

if (P2 <= 30000)

P2=30000;

end

if (P2 >= 105000)

P2=105000;

end

Pt=P1+P2;

if Pt ~= Pd

Psel=Pd-Pt;

P1=P1+Psel;

if (P1<30000) || (P1>105000)

P1=P1-Psel;

P2=P2+Psel;

end

end

X{a}=[P1 P2];

end

%-------------------mulai iterasi

for c=1:iterasi

%----------mutasi

for d=1:pop

idx=randint(pop,1,[1,pop]);

X\_mut{d}=X{1,idx(1,1)}+0.1\*(X{1,idx(2,1)}-X{1,idx(3,1)});

end

%---------crossover

for e=1:pop

k\_cross=0.5;

acak=rand;

if acak <= k\_cross

X\_cross{e}=X\_mut{1,e};

else X\_cross{e}=X{1,e};

end

end

%-------cek batas individu baru

for f=1:pop

for g=1:2

if (X\_cross{1,f}(1,g) <= 30000)

Pb{f}(g)=30000;

end

if (X\_cross{1,f}(1,g) >= 105000)

Pb{f}(g)=105000;

end

if (X\_cross{1,f}(1,g) > 30000) && (X\_cross{1,f}(1,g) < 105000)

Pb{f}(g)=X\_cross{1,f}(1,g);

end

end

end

%--------cek jumlah individu baru

for h=1:pop

Pt2=sum(Pb{1,h});

Pc1{h}=Pb{1,h}(1,1);

Pc2{h}=Pb{1,h}(1,2);

if Pt2 ~= Pd

Psel2{h}=Pd-Pt2;

Pc1{h}=Pb{1,h}(1,1)+Psel2{1,h};

if (Pc1{1,h}<30000) || (Pc1{1,h}>105000)

Pc1{h}=Pc1{1,h}-Psel2{1,h};

Pc2{h}=Pb{1,h}(1,2)+Psel2{1,h};

end

end

Xb{h}=[Pc1{1,h} Pc2{1,h}];

Pt3{h}=sum(Xb{1,h});

end

for i=1:pop

F2a=alpha\_2+beta\_2\*(X{1,i}(1,1))+gamma\_2\*((X{1,i}(1,1))^2);

F3a=alpha\_3+beta\_3\*(X{1,i}(1,2))+gamma\_3\*((X{1,i}(1,2))^2);

F\_tota{i}=F2a+F3a;

F2b=alpha\_2+beta\_2\*(Xb{1,i}(1,1))+gamma\_2\*((Xb{1,i}(1,1))^2);

F3b=alpha\_3+beta\_3\*(Xb{1,i}(1,2))+gamma\_3\*((Xb{1,i}(1,2))^2);

F\_totb{i}=F2b+F3b;

end

%----------Seleksi

for j=1:pop

if F\_totb{1,j} < F\_tota{1,j}

X\_sel{j}=Xb{1,j};

else X\_sel{j}=X{1,j};

end

end

X=X\_sel;

%---------F akhir

for k=1:pop

F2\_akhir=alpha\_2+beta\_2\*(X{1,k}(1,1))+gamma\_2\*((X{1,k}(1,1))^2);

F3\_akhir=alpha\_3+beta\_3\*(X{1,k}(1,2))+gamma\_3\*((X{1,k}(1,2))^2);

F\_tot\_akhir{k}=F2\_akhir+F3\_akhir;

end

Fmin\_akhir=min(cell2mat(F\_tot\_akhir));

for l=1:pop

if Fmin\_akhir == F\_tot\_akhir{1,l}

ind\_opt=X{1,l};

end

end

Fmin\_all{c}=Fmin\_akhir;

ind\_opt\_all{c}= ind\_opt;

end

**iterasi\_lambda**

function [Ct,P1,P2,P3]=iterasi\_lambda(Pd)

epsilon=0.001;

alpha=[11539.596; 16346.351; 13978.2174];

beta=[0.1697564; 0.015187438; 0.11871682];

gamma=[1.168e-6; 2.3297e-6; 1.3703e-6];

gamma\_12=[1.168e-6; 2.3297e-6];

gamma\_13=[1.168e-6; 1.3703e-6];

gamma\_23=[2.3297e-6; 1.3703e-6];

PD=Pd;

delta\_P=0.001;

lambda=0.2;

iterasi=0;

a=0;

while abs(delta\_P) >= epsilon

iterasi=iterasi+1;

P=(lambda-beta)./(2\*gamma);

delta\_P=PD - sum(P);

J=sum(1./(2\*gamma));

delta\_lambda=(delta\_P)/J;

lambda=lambda+delta\_lambda;

end

J1= sum(1./(2\*gamma\_23));

J2= sum(1./(2\*gamma\_13));

J3= sum(1./(2\*gamma\_12));

iterasi=iterasi+1;

if P(1) < 30000

P(1)=30000;

delta\_P=PD - (P(1)+P(2)+P(3));

delta\_lambda=(delta\_P)/J1;

lambda=lambda+delta\_lambda;

P(2)=(lambda-beta(2))./(2\*gamma(2));

P(3)=(lambda-beta(3))./(2\*gamma(3));

end

if P(1) > 105000

a=a+1;

P(1)=105000;

delta\_P=PD - (P(1)+P(2)+P(3));

delta\_lambda=(delta\_P)/J1;

lambda=lambda+delta\_lambda;

P(2)=(lambda-beta(2))./(2\*gamma(2));

P(3)=(lambda-beta(3))./(2\*gamma(3));

end

if P(2) < 30000

P(2) = 30000;

delta\_P=PD - (P(1)+P(2)+P(3));

delta\_lambda=(delta\_P)/J2;

lambda=lambda+delta\_lambda;

P(1)=(lambda-beta(1))./(2\*gamma(1));

P(3)=(lambda-beta(3))./(2\*gamma(3));

end

if P(2) > 105000

P(2) = 105000;

delta\_P=PD - (P(1)+P(2)+P(3));

delta\_lambda=(delta\_P)/J2;

lambda=lambda+delta\_lambda;

P(1)=(lambda-beta(1))./(2\*gamma(1));

P(3)=(lambda-beta(3))./(2\*gamma(3));

end

if P(3) < 30000

P(3)= 30000;

delta\_P=PD - (P(1)+P(2)+P(3));

delta\_lambda=(delta\_P)/J3;

lambda=lambda+delta\_lambda;

P(1)=(lambda-beta(1))./(2\*gamma(1));

P(2)=(lambda-beta(2))./(2\*gamma(2));

end

if P(3) > 105000

a=a+1;

P(3) = 105000;

delta\_P=PD - (P(1)+P(2)+P(3));

delta\_lambda=(delta\_P)/J3;

lambda=lambda+delta\_lambda;

if a==1

P(1)=(lambda-beta(1))./(2\*gamma(1));

P(2)=(lambda-beta(2))./(2\*gamma(2));

end

if a==2

%P(1)=(lambda-beta(1))./(2\*gamma(1));

P(2)=(lambda-beta(2))./(2\*gamma(2));

delta\_P=PD - (P(1)+P(2)+P(3));

P(2)=P(2)+delta\_P;

end

end

P1=P(1);

P2=P(2);

P3=P(3);

F1=11539.596+0.1697564\*P(1)+1.168e-6\*P(1)^2;

F2=16346.351+0.015187438\*P(2)+2.3297e-6\*P(2)^2;

F3=13978.2174+0.11871682\*P(3)+1.3703e-6\*P(3)^2;

Ct=F1+F2+F3;