Appendix A

```
function varargout = power control(varargin)
% power control MATLAB code for power control.fig
% power control  , by itself, creates a new LASTY or raises the
existingsingleton*.
% H = power control returns the handle to a new power control or the
%handle to the existing singleton*.

% power control('CALLBACK',hObject,eventData,handles,...) calls the
local function named CALLBACK in LASTY.M with the given input
arguments.
% power control('Property','Value',...) creates a new power control or
raises the existing singleton*.  Starting from the left, property
value pairs are
%applied to the GUI before power control_OpeningFcn gets called.  An
unrecognized property name or invalid value makes property application
stop.  All inputs are passed to LASTY_OpeningFcn via varargin.
*See GUI Options on GUIDE's Tools menu.  Choose "GUI allows only one
%instance to run (singleton)".
% See also: GUIDE, GUIDATA, GUIHANDLES

% Edit the above text to modify the response to help power control

% Last Modified by GUIDE v2.5 31-Jan-2013 14:43:29
% Begin initialization code - DO NOT EDIT
gui_Singleton = 1;
gui_State = struct('gui_Name',       mfilename, ...
                   'gui_Singleton',  gui_Singleton, ...
                    'gui_OpeningFcn', @powercontrolOpeningFcn, ...
                    'gui_OutputFcn',  @powercontrol_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
% End initialization code - DO NOT EDIT

% --- Executes just before LASTY is made visible.
function powercontrol_OpeningFcn(hObject, eventdata, handles,
varargin)
% This function has no output args, see OutputFcn.
% hObject    handle to figure
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
% varargin   command line arguments to power control (see VARARGIN)

% Choose default command line output for power control
handles.output = hObject;

% Update handles structure
guidata(hObject, handles);

% UIWAIT makes power control wait for user response (see UIRESUME)
% uiwait(handles.figure1);


% --- Outputs from this function are returned to the command line.
function varargout = powercontrol_OutputFcn(hObject, eventdata,
handles)
% varargout  cell array for returning output args (see VARARGOUT);
% hObject    handle to figure
```

```
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Get default command line output from handles structure
varargout{1} = handles.output;


function recivedpower_Callback(hObject, eventdata, handles)
% hObject    handle to edit9 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit9 as text
%        str2double(get(hObject,'String')) returns contents of edit9
as a double


% --- Executes during object creation, after setting all properties.
function recivedpower_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit9 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end


function pathlossestimation_Callback(hObject, eventdata, handles)
% hObject    handle to edit10 (see GCBO)
```

```
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit10 as text
%        str2double(get(hObject,'String')) returns contents of edit10
as a double


% --- Executes during object creation, after setting all properties.
function pathlossestimation_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit10 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end


function calculatetransmitpower_Callback(hObject, eventdata, handles)
% hObject    handle to edit11 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit11 as text
%        str2double(get(hObject,'String')) returns contents of edit11
as a double


% --- Executes during object creation, after setting all properties.
function calculatetransmitpower_CreateFcn(hObject, eventdata, handles)
```

```
% hObject    handle to edit11 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end



function transmitpowertoenB_Callback(hObject, eventdata, handles)
% hObject    handle to edit12 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit12 as text
%        str2double(get(hObject,'String')) returns contents of edit12
as a double



% --- Executes during object creation, after setting all properties.
function transmitpowertoenB_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit12 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
```

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


function recivedpoweratenB_Callback(hObject, eventdata, handles)
% hObject    handle to edit13 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit13 as text
%        str2double(get(hObject,'String')) returns contents of edit13
as a double


% --- Executes during object creation, after setting all properties.
function  recivedpoweratenB_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit13 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
set(hObject,'BackgroundColor','white');
end
function calculatethecellthroughput_Callback(hObject, eventdata,
handles)
% hObject    handle to edit14 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit14 as text
```

```
% str2double(get(hObject,'String')) returns contents of edit14 as a
double
% --- Executes during object creation, after setting all properties.
function calculatethecellthroughput_CreateFcn(hObject, eventdata,
handles)
% hObject    handle to edit14 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called
% Hint: edit controls usually have a white background on Windows.
% See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
set(hObject,'BackgroundColor','white');
end
function enBtransmitsignal_Callback(hObject, eventdata, handles)
% hObject    handle to edit1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit1 as text
% str2double(get(hObject,'String')) returns contents of edit1 as a
double
% --- Executes during object creation, after setting all properties.
function enBtransmitsignal_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.See
ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
set(hObject,'BackgroundColor','white');
```

```
end
function recivedpower_Callback(hObject, eventdata, handles)
% hObject    handle to edit2 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit2 as text
%        str2double(get(hObject,'String')) returns contents of edit2
as a double

% --- Executes during object creation, after setting all properties.
function recivedpower_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit2 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end
function estimationpathloss_Callback(hObject, eventdata, handles)
% hObject    handle to edit3 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit3 as text
%        str2double(get(hObject,'String')) returns contents of edit3
as a double


% --- Executes during object creation, after setting all properties.
function estimationpathloss_CreateFcn(hObject, eventdata, handles)
```

```
% hObject    handle to edit3 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.See
ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
set(hObject,'BackgroundColor','white');
end
function decidetransmitpower_Callback(hObject, eventdata, handles)
% hObject    handle to edit4 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit4 as text
%        str2double(get(hObject,'String')) returns contents of edit4
as a double
% --- Executes during object creation, after setting all properties.
function decidetransmitpower_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit4 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called
% Hint: edit controls usually have a white background on Windows.See
ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
set(hObject,'BackgroundColor','white');
end



function calculatetransmitpower_Callback(hObject, eventdata, handles)
```

```
% hObject    handle to edit5 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit5 as text
%        str2double(get(hObject,'String')) returns contents of edit5
as a double
% --- Executes during object creation, after setting all properties.
function calculatetransmitpower_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit5 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.See
ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
set(hObject,'BackgroundColor','white');
end

function transmitpowerincaseofclosedloop_Callback(hObject, eventdata,
handles)
% hObject    handle to edit6 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit6 as text
str2double(get(hObject,'String')) returns contents of edit6 as a
double


% --- Executes during object creation, after setting all properties.
function transmitpowerincaseofclosedloop_CreateFcn(hObject, eventdata,
handles)
```

```
% hObject    handle to edit6 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.See
ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
set(hObject,'BackgroundColor','white');
end
function transmitpowertoenB_Callback(hObject, eventdata, handles)
% hObject    handle to edit7 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit7 as text
str2double(get(hObject,'String')) returns contents of edit7 as a
double

% --- Executes during object creation, after setting all properties.
function transmitpowertoenB_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit7 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
set(hObject,'BackgroundColor','white');
end

function edit8_Callback(hObject, eventdata, handles)
```

```
% hObject    handle to edit8 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit8 as text
%str2double(get(hObject,'String')) returns contents of edit8 as a
double

% --- Executes during object creation, after setting all properties.
function measuringrecivedSINR_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit8 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.See
ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
set(hObject,'BackgroundColor','white');
end
% --- Executes on button press in pushbutton2.
function pushbutton2_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton2 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
Po=-38;
a=0.4;
PL=20;
Pr=Po+(a-1)*PL;
set(handles.text2,'string',Pr);

% --- Executes on button press in pushbutton18.
function pushbutton18_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton18 (see GCBO)
```

```
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
Pmax=24;
M=180;
a=1;
Po=-10;
PL=20;
Pol={Pmax,10*log10(M)+Po+a*PL}
handles.Pol=get(hObject,'value')
guidata(hObject, handles);

% --- Executes on button press in pushbutton19.
function pushbutton19_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton19 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
Pmax=24;
M=180;
a=0.4;
Po=-38;
PL=20;
Pol=32;
deltai=-1;
Pcl={Pmax,Pol+deltai}
guidata(hObject, handles);

% --- Executes on button press in pushbutton20.
function pushbutton20_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton20 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
%-------------power spectral density calculation(GIPC algorithm)-----
Io=str2num(get(handles.edit10,'string'));
B=str2num(get(handles.edit11,'string'));
PGs=20;
```

```
PGi=-70 ;
Y=0.5;
PSDi=Io-PGs*B-PGi*Y;
set(handles.text11,'string',PSDi);

% --- Executes on button press in pushbutton21.
function pushbutton21_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton21 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
%-----------combined open and closed loop algorithm-------------------
for a=0:0.1:1
for Po =-38:10:-80
PRXDL=23;
deltaUE=10;
deltaTF=-4;
Pmax=24;
Prb={Po-a*PRXDL+deltaUE+deltaTF,Pmax}
guidata(hObject, handles);
figure
grid on
hold on
plot(Po,Prb,'--ro')
end
end

function calculateuserthroughput_Callback(hObject, eventdata, handles)
% hObject    handle to edit15 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit15 as text
% str2double(get(hObject,'String')) returns contents of edit15 as a
double
```

```
% --- Executes during object creation, after setting all properties.
function calculateuserthroughput_CreateFcn(hObject, eventdata,
handles)
% hObject    handle to edit15 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end

function calculatepowerspectraldensity_Callback(hObject, eventdata,
handles)
% hObject    handle to edit16 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit16 as text
% str2double(get(hObject,'String')) returns contents of edit16 as a
double

% --- Executes during object creation, after setting all properties.
function calculatepowerspectraldensity_CreateFcn(hObject, eventdata,
handles)
% hObject    handle to edit16 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows. See
ISPC and COMPUTER.
```

```
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
set(hObject,'BackgroundColor','white');
end

function calculateSINR_Callback(hObject, eventdata, handles)
% hObject    handle to edit17 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit17 as text
% str2double(get(hObject,'String')) returns contents of edit17 as a
double

% --- Executes during object creation, after setting all properties.
function calculateSINR_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit17 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.See
ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
set(hObject,'BackgroundColor','white');
end

function setTPCcommand_Callback(hObject, eventdata, handles)
% hObject    handle to edit18 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit18 as text
```

```
%str2double(get(hObject,'String')) returns contents of edit18 as a
double
% --- Executes during object creation, after setting all properties.
function setTPCcommand_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit18 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns
called

% Hint: edit controls usually have a white background on Windows.
%See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
set(hObject,'BackgroundColor','white');
end

% --- Executes on button press in pushbutton14.
function pushbutton14_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton14 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
% THE Generalized Interference Power Control(GIPC)Algorithm
%------------------calculate the cell throughput----------------------
% c : the bandwidth
% PB: the physical resourse block
% T : the cell throughput
C=str2num(get(handles.edit6,'string'));
PB=str2num(get(handles.edit7,'string'));
T=C*PB;
set(handles.text5,'string',T);
axes(handles.axes1);
cla;
plot(T,C)
grid
```

```
% --- Executes on button press in pushbutton15.
function pushbutton15_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton15 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
%---------------------the user throughput-----------------------------
W=str2num(get(handles.edit8,'string')); %the bandwidth of one physical
resourse blok
SINReff=str2num(get(handles.edit9,'string'));%signal to interference
noise eefeciency
V=0.68;%correction factor
M=50;%the number of physical resource allocated
Weff=0.72;% the bandwidth effeciency
SINR=.2;
Tr=W*Weff*V*M*log2(1+(SINR/SINReff));
set(handles.text6,'string',Tr);

% --- Executes on button press in pushbutton16.
function pushbutton16_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton16 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
%---------------------- GIPC algorithm--------------------
Io=str2num(get(handles.edit10,'string'));
B=str2num(get(handles.edit11,'string'));
PGs=20;
PGi=-70 ;
Y=0.5;
PSDi=Io-PGs*B-PGi*Y;
set(handles.text11,'string',PSDi);

% --- Executes on button press in pushbutton17.
function pushbutton17_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton17 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
```

```
% handles    structure with handles and user data (see GUIDATA)
%----------------------signal to interference noise ratio calculation-
B=str2num(get(handles.edit12,'string'));
Y=str2num(get(handles.edit13,'string'));
Io=-157;
PGs=134;
PGi=20;
I=-40;
N=-174;
Si=Io*(PGs^(1-B))/(PGi^Y*(I+N));
set(handles.text12,'string',Si);

% --- Executes on button press in pushbutton9.
function pushbutton9_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton9 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
%------------open loop algorithm using path loss----------------------
Po=-81;
a=0.8;
PL=20;
PSDtx=Po+a*PL
guidata(hObject, handles);
plot(a,PL(2,:),'color','b','Linestyle',':','Marker','.');
plot(a,PL(1,:),'color','r','Linestyle',':','Marker','.');
xlabel('PL [dB]')
ylabel('alpha')
grid on

% --- Executes on button press in pushbutton10.
function pushbutton10_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton10 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
%----------calculate the power recived from eNB using pathloss--------
```

```
Po=-38;
a=0.4;
PL=20;
PSDrx=Po+(a-1)*PL
guidata(hObject, handles);

% --- Executes on button press in pushbutton11.
function pushbutton11_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton11 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
%------------------estimation path loss-------------------------------
a=0.6;
Ph=23;
M=180;
Po=-58;
i=3;
PL=1/(a*(Ph-10*log10(M)-Po-a*i))
guidata(hObject, handles);

% --- Executes on button press in pushbutton12.
function pushbutton12_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton12 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
%-------------------decide transmission power ------------------------
for a=0:0.1:1
SNRo=-5:0.1:5;
Pn=-116;
Pmax=23;
pl=20;
Ptx=a*(SNRo+Pn)+(1-a)*(Pmax)+a*pl;
guidata(hObject, handles);
set(a,'XTick',0:0.1:1)
set(a,'XTickLabel',{'0.1','0.2','0,3','0.4','0.5'})
```

```
xlabel('a')
ylabel('SINRo')
title('Plot of Ptx')
hold on
end
% --- Executes on button press in pushbutton13.
function pushbutton13_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton13 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
%--------------------------- FPC algorithm--------------------
for a=0:0.1:1
Po=[-20,-38,-59,-81,-102,-110];
PG=-100;
Ptr=Po-a*PG;
guidata(hObject, handles);
figure
plot(Po,Pol,'-.m*')
grid on
hold on
end

% --- Executes on button press in pushbutton3.
function pushbutton3_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton3 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
a=0.6;
Ph=23;
M=180;
Po=-58;
i=3;
PL=1/(a*(Ph-10*log10(M)-Po-a*i));
set(handles.text3,'string',PL);
```

```
% --- Executes on button press in pushbutton4.
function pushbutton4_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton4 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
a=0.8;
SNRo=5;
Pn=-116;
Pmax=23;
pl=20;
Ptx=a*(SNRo+Pn)+(1-a)*(Pmax)+a*pl;
set(handles.text4,'string',Ptx);

% --- Executes on button press in pushbutton5.
function pushbutton5_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton5 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
for a=0:0.1:1
for Po =-38:10:-80
SNRo=5;
Pn=-116;
Pmax=23;
pl=20;
Ptx=a*(SNRo+Pn)+(1-a)*(Pmax)+a*pl;
set(handles.text5,'string',Ptx);
end
end
% --- Executes on button press in pushbutton6.
function pushbutton6_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton6 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
for a=0:0.1:1
for Po =-38:10:-80
```

```
a=0.8;
SNRo=5;
Pn=-116;
Pmax=23;
pl=20;
Ptx=a*(SNRo+Pn)+(1-a)*(Pmax)+a*pl;
set(handles.text5,'string',Ptx);
end
end
% --- Executes on button press in pushbutton7.
function pushbutton7_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton7 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
%-------------calculate the interference using GIPC algorithm---------
Io=-157;
PGI=3;
PGs=28;
B=0.5;
S=Io-(1-B)*(PGs-PGI);
set(handles.text7,'string',S);

% --- Executes on button press in pushbutton8.
function pushbutton8_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton8 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
%-------------------set TPC command---------------------------------
%transmit power command set debending on the defrence between SINR and
%SINR target
TPC= SINR(i)- SINRtarget
SINR(i)=Pr(i)/(I+n)
Pr=PSD(i)*PG
SINRtarget=(a-1)*(PL-PLmax)+SINR(i)
if (-1 < difference[dB]) {
```

```
gui_State.gui_Callback = str2func(diffrence{0})
0 is sent
end
}
if (1 < difference[dB]){
gui_State.gui_Callback = str2func(diffrence{1})
1 is sent;
end
}
else if (difference[dB] > 5){
gui_State.gui_Callback = str2func(diffrence{3})
3 is sent;
end
}
```