Apéndice E

Lista del programa del Filtro KHN y KHN Bicuadrático

Listado del programa: Filtro KHN y KHN Bicuadrático

```matlab
function khnpb_OpeningFcn(hObject, eventdata, handles, varargin)

N = varargin{1};
TIPO = varargin{2};
n = N;
global bandera
global handles

if bandera == 3
    set(handles.TagEditN,'string',num2str(N*2))
else
    if TIPO == ' '
        if bandera == 0%%Thosmson
            set(handles.TagEditN,'string',num2str(N))
        else
            set(handles.TagEditN,'string',num2str(N*2))
        end
    else
        set(handles.TagEditN,'string',num2str(N))
    end
end

global poles
global Q
global Wn
global Wc

    P = poles;
    Wn = sqrt(((real(P)).^2)+(imag(P).^2));
    Q = (Wn./(2*(abs(real(P)))));
    %Q = sort(Q,'descend');
    if Wn == Wn(1)
        Q = sort(Q,'descend');
    else
        Wn;
    end

%%%%metodo para no duplicar los valores de Q
if bandera == 3
    Q(2:2:(n*2)) = [];
    Wn(2:2:(n*2)) = [];
else
    if TIPO == ' '
        Q(2:2:(n*2)) = [];
        Wn(2:2:(n*2)) = [];
    else
        Q(2:2:(n)) = [];
        Wn(2:2:(n)) = [];
    end
end

Q2 = num2str(Q);
Wn2 =num2str(Wn);
val = strcat(Wn2, ' ,  ',Q2);
```

```matlab
set(handles.TagListboxWn,'string',num2str(val))
posval=get(handles.TagListboxWn,'value');
set(handles.TagEditWn2,'string',num2str(Wn(posval,:)))
set(handles.TagEditQ2,'string',num2str(Q(posval,:)))

C = str2num(get(handles.TagEditC,'String'));
R3 = str2num(get(handles.TagEditR3,'String'));

R5 = R3;
R6 = R3;
C1 = C;
C2 = C;
R1 = (1./(Wn(posval)*C));
R2 = R1;
R4 = ((2*Q(posval))-1)*R3;

switch TIPO
    case 'low'
        Ho = ((2*Q(posval))-1)./Q(posval);
    case 'high'
        Ho = ((2*Q(posval))-1)./Q(posval);
    case ' '
        Ho = abs(1-(2*Q(posval)));
end

%%%%%imprime los valores de salida
set(handles.TagEditC1,'string',num2str(C1));
set(handles.TagEditC2,'string',num2str(C2));
set(handles.TagEditR1,'string',num2str(R1));
set(handles.TagEditR2,'string',num2str(R2));
set(handles.TagEditR4,'string',num2str(R4));
set(handles.TagEditR5,'string',num2str(R5));
set(handles.TagEditR6,'string',num2str(R6));
set(handles.TagEditHo,'string',num2str(Ho));

handles.R1 = R1;
handles.R2 = R2;
handles.R3 = R3;
handles.R4 = R4;
handles.R5 = R5;
handles.R6 = R6;
handles.C1 = C1;
handles.C2 = C2;

T = ['khn.jpg'];
[X,MAP] = IMREAD(T,'jpg');
subplot(handles.axes1)
image(X)
colormap(MAP)
axis off
axis equal

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

% Update handles structure
guidata(hObject, handles);
```

```matlab
function TagListboxWn_Callback(hObject, eventdata, handles)

global Q
global Wn
global N
global Wc
global TIPO
global handles

s = get(handles.TagListboxWn,'value');


C = str2num(get(handles.TagEditC,'String'));
R3 = str2num(get(handles.TagEditR3,'String'));


R5 = R3;
R6 = R3;
C1 = C;
C2 = C;
R1 = (1./(Wn(s)*C));
R2 = R1;
R4 = ((2*Q(s))-1)*R3;


switch TIPO
    case 'low'
        Ho = ((2*Q(s))-1)./Q(s);
    case 'high'
        Ho = ((2*Q(s))-1)./Q(s);
    case ' '
        Ho = abs(1-(2*Q(s)));
end


%%%%imprime los valores de salida
set(handles.TagEditC1,'string',num2str(C1));
set(handles.TagEditC2,'string',num2str(C2));
set(handles.TagEditR1,'string',num2str(R1));
set(handles.TagEditR2,'string',num2str(R2));
set(handles.TagEditR5,'string',num2str(R5));
set(handles.TagEditR4,'string',num2str(R4));
set(handles.TagEditR6,'string',num2str(R6));
set(handles.TagEditHo,'string',num2str(Ho));

handles.R1(s) = R1;
handles.R2(s) = R2;
handles.R3(s) = R3;
handles.R4(s) = R4;
handles.R5(s) = R5;
handles.R6(s) = R6;
handles.C1(s) = C1;
handles.C2(s) = C2;


if mod (N,2)~=0
    if Q(s)<=.5
        set(handles.TagEditC1,'enable','off')
        set(handles.TagEditC2,'enable','off')
        set(handles.TagEditR1,'enable','off')
        set(handles.TagEditR2,'enable','off')
        set(handles.TagEditR4,'enable','off')
        set(handles.TagEditR5,'enable','off')
        set(handles.TagEditR6,'enable','off')
        set(handles.TagEditHo,'enable','off')
```

```matlab
        warningpb(Wc)
    else
        set(handles.TagEditC1,'enable','on')
        set(handles.TagEditC2,'enable','on')
        set(handles.TagEditR1,'enable','on')
        set(handles.TagEditR2,'enable','on')
        set(handles.TagEditR4,'enable','on')
        set(handles.TagEditR5,'enable','on')
        set(handles.TagEditR6,'enable','on')
        set(handles.TagEditHo,'enable','on')
    end
end

set(handles.TagEditWn2,'string',num2str(Wn(s,:)))
set(handles.TagEditQ2,'string',num2str(Q(s,:)))
clc

function TagPushBack_Callback(hObject, eventdata, handles)
global bandera
close;
if bandera == 0%%%Thomson
    activeTT(1,2,3,4,5,6)
else
    active(1,2,3,4);
end
clear global handles
clc

function pushbutton4_Callback(hObject, eventdata, handles)
global TIPO
global N
global handles
global bandera
global C
global R

s = get(handles.TagListboxWn,'value');
        delete respuesta.cir
        diary respuesta.cir
        fprintf('\n')
        fprintf('.lib "nom.lib"\n')
        fprintf('.AC DEC 100 .01 10\n')
        fprintf('.PROBE V(*) I(*) W(*) D(*) NOISE(*)\n')
        fprintf('v1 11 0 DC 0Vdc AC 1Vac \n')

switch TIPO
    case {'low','high'}
        for j = 1:(N/2)
            R1(s) = handles.R1(j);
            R2(s) = handles.R2(j);
            R3(s) = handles.R3(j);
            R4(s) = handles.R4(j);
            R5(s) = handles.R5(j);
            R6(s) = handles.R6(j);
            C1(s) = handles.C1(j);
            C2(s) = handles.C2(j);
                if mod(N,2)~=0
                    if j == 1
                        fprintf('R3%d 1%d 2%d %f\n',j,j,j,R3(s))
                        fprintf('E1%d 3%d 0 2%d 8%d 1meg\n',j,j,j,j)
```

```matlab
                    fprintf('R6%d 8%d 3%d %f\n',j,j,j,R6(s))
                    fprintf('R1%d 3%d 4%d %f\n',j,j,j,R1(s))
                    fprintf('R5%d 8%d 7%d %f\n',j,j,j,R5(s))
                    fprintf('C1%d 4%d 5%d %f\n',j,j,j,C1(s))
                    fprintf('E2%d 5%d 0 0 4%d 1meg\n',j,j,j)
                    fprintf('R2%d 5%d 6%d %f\n',j,j,j,R2(s))
                    fprintf('C2%d 6%d 7%d %f\n',j,j,j,C2(s))
                    fprintf('E3%d 7%d 0 0 6%d 1meg\n',j,j,j)
                    fprintf('R4%d 2%d 5%d %f\n',j,j,j,R4(s))
                    fprintf('R7%d 7%d 9%d %f\n',j,j,j,R)
                    fprintf('C4%d 9%d 0 %f\n',j,j,C)
                else
                    switch TIPO
                        case 'low'
                            fprintf('R3%d 7%d 2%d %f\n',j,j-
1,j,R3(s))

                            fprintf('R7%d 7%d 9%d %f\n',j,j,j,R)
                            fprintf('C4%d 9%d 0 %f\n',j,j,C)
                        case 'high'
                            fprintf('R3%d 3%d 2%d %f\n',j,j-
1,j,R3(s))

                            fprintf('R7%d 9%d 0 %f\n',j,j,R)
                            fprintf('C4%d 3%d 9%d %f\n',j,j,j,C)
                    end
                    fprintf('E1%d 3%d 0 2%d 8%d 1meg\n',j,j,j,j)
                    fprintf('R6%d 8%d 3%d %f\n',j,j,j,R6(s))
                    fprintf('R1%d 3%d 4%d %f\n',j,j,j,R1(s))
                    fprintf('R5%d 8%d 7%d %f\n',j,j,j,R5(s))
                    fprintf('C1%d 4%d 5%d %f\n',j,j,j,C1(s))
                    fprintf('E2%d 5%d 0 0 4%d 1meg\n',j,j,j)
                    fprintf('R2%d 5%d 6%d %f\n',j,j,j,R2(s))
                    fprintf('C2%d 6%d 7%d %f\n',j,j,j,C2(s))
                    fprintf('E3%d 7%d 0 0 6%d 1meg\n',j,j,j)
                    fprintf('R4%d 2%d 5%d %f\n',j,j,j,R4(s))
                end
            else
                if j == 1
                    fprintf('R3%d 1%d 2%d %f\n',j,j,j,R3(s))
                    fprintf('E1%d 3%d 0 2%d 8%d 1meg\n',j,j,j,j)
                    fprintf('R6%d 8%d 3%d %f\n',j,j,j,R6(s))
                    fprintf('R1%d 3%d 4%d %f\n',j,j,j,R1(s))
                    fprintf('R5%d 8%d 7%d %f\n',j,j,j,R5(s))
                    fprintf('C1%d 4%d 5%d %f\n',j,j,j,C1(s))
                    fprintf('E2%d 5%d 0 0 4%d 1meg\n',j,j,j)
                    fprintf('R2%d 5%d 6%d %f\n',j,j,j,R2(s))
                    fprintf('C2%d 6%d 7%d %f\n',j,j,j,C2(s))
                    fprintf('E3%d 7%d 0 0 6%d 1meg\n',j,j,j)
                    fprintf('R4%d 2%d 5%d %f\n',j,j,j,R4(s))
                else
                    switch TIPO
                        case 'low'
                            fprintf('R3%d 7%d 2%d %f\n',j,j-
1,j,R3(s))

                        case 'high'
                            fprintf('R3%d 3%d 2%d %f\n',j,j-
1,j,R3(s))

                    end
                    fprintf('E1%d 3%d 0 2%d 8%d 1meg\n',j,j,j,j)
                    fprintf('R6%d 8%d 3%d %f\n',j,j,j,R6(s))
                    fprintf('R1%d 3%d 4%d %f\n',j,j,j,R1(s))
                    fprintf('R5%d 8%d 7%d %f\n',j,j,j,R5(s))
```

```matlab
                            fprintf('C1%d 4%d 5%d %f\n',j,j,j,C1(s))
                            fprintf('E2%d 5%d 0 0 4%d 1meg\n',j,j,j)
                            fprintf('R2%d 5%d 6%d %f\n',j,j,j,R2(s))
                            fprintf('C2%d 6%d 7%d %f\n',j,j,j,C2(s))
                            fprintf('E3%d 7%d 0 0 6%d 1meg\n',j,j,j)
                            fprintf('R4%d 2%d 5%d %f\n',j,j,j,R4(s))
                    end
                end
        end
    case ' '
        for j = 1:N
            R1(s) = handles.R1(j);
            R2(s) = handles.R2(j);
            R3(s) = handles.R3(j);
            R4(s) = handles.R4(j);
            R5(s) = handles.R5(j);
            R6(s) = handles.R6(j);
            C1(s) = handles.C1(j);
            C2(s) = handles.C2(j);
            if j == 1
                fprintf('R3%d 1%d 2%d %f\n',j,j,j,R3(s))
                fprintf('E1%d 3%d 0 2%d 8%d 1meg\n',j,j,j,j)
                fprintf('R6%d 8%d 3%d %f\n',j,j,j,R6(s))
                fprintf('R1%d 3%d 4%d %f\n',j,j,j,R1(s))
                fprintf('R5%d 8%d 7%d %f\n',j,j,j,R5(s))
                fprintf('C1%d 4%d 5%d %f\n',j,j,j,C1(s))
                fprintf('E2%d 5%d 0 0 4%d 1meg\n',j,j,j)
                fprintf('R2%d 5%d 6%d %f\n',j,j,j,R2(s))
                fprintf('C2%d 6%d 7%d %f\n',j,j,j,C2(s))
                fprintf('E3%d 7%d 0 0 6%d 1meg\n',j,j,j)
                fprintf('R4%d 2%d 5%d %f\n',j,j,j,R4(s))
            else
                fprintf('R3%d 5%d 2%d %f\n',j,j-1,j,R3(s))
                fprintf('E1%d 3%d 0 2%d 8%d 1meg\n',j,j,j,j)
                fprintf('R6%d 8%d 3%d %f\n',j,j,j,R6(s))
                fprintf('R1%d 3%d 4%d %f\n',j,j,j,R1(s))
                fprintf('R5%d 8%d 7%d %f\n',j,j,j,R5(s))
                fprintf('C1%d 4%d 5%d %f\n',j,j,j,C1(s))
                fprintf('E2%d 5%d 0 0 4%d 1meg\n',j,j,j)
                fprintf('R2%d 5%d 6%d %f\n',j,j,j,R2(s))
                fprintf('C2%d 6%d 7%d %f\n',j,j,j,C2(s))
                fprintf('E3%d 7%d 0 0 6%d 1meg\n',j,j,j)
                fprintf('R4%d 2%d 5%d %f\n',j,j,j,R4(s))
            end
        end
end

if TIPO == ' '
    j = N;
    fprintf('.print AC V(5%d)\n',j)
else
    if mod(N,2)~=0
        j = int8((N/2)-1);
        fprintf('.print AC V(9%d)\n',j)
    else
        j = N/2;
        switch TIPO
            case 'low'
                fprintf('.print AC V(7%d)\n',j)
            case 'high'
                fprintf('.print AC V(3%d)\n',j)
```

```matlab
        end
    end
end

fprintf('.end')
diary off

!C:/Orcad/PSpice/pspice.exe C:/elip3/respuesta.cir run

function pushbutton5_Callback(hObject, eventdata, handles)
global Ws
global TIPO
global handles
global Wc
global N
global Q
global bandera

if bandera == 0 %%%thomson
    Ws = Wc;
end

v = get(handles.TagListboxWn,'value');

R1 = handles.R1(v);
R2 = handles.R2(v);
R3 = handles.R3(v);
R4 = handles.R4(v);
R5 = handles.R5(v);
R6 = handles.R6(v);
C1 = handles.C1(v);
C2 = handles.C2(v);

switch TIPO
    case 'low'
        if mod(N,2)~=0
            z = ((1+(R6/R5))/(1+(R3/R4)))*(1/(R1*C1));
            p1 = (1/(R1*C1))*((1+(R6/R5))/(1+(R4/R3)));
            p = (R6/R5)/(R1*R2*C1*C2);

            num = [0 z];
            den = [1 p1 p];

            if Q(v)<=.5
                global C
                C;
                R = 1/(Wc*C);
                p1 = R;
                p = 1;

                num = [0 1];
                den = [p1 p];
            end
        else
            z = ((1+(R6/R5))/(1+(R3/R4)))*(1/(R1*C1));
            p1 = (1/(R1*C1))*((1+(R6/R5))/(1+(R4/R3)));
            p = (R6/R5)/(R1*R2*C1*C2);

            num = [0 z];
```

```matlab
            den = [1 p1 p];
        end
    case 'high'
        if mod(N,2)~=0
            z = ((1+(R6/R5))/(1+(R3/R4)));
            p1 = (1/(R1*C1))*((1+(R6/R5))/(1+(R4/R3)));
            p = (R6/R5)/(R1*R2*C1*C2);

            num = [z 0 0];
            den = [1 p1 p];

            if Q(v)<=.5
                global C
                C;
                R = 1/(Wc*C);
                p1 = R;
                p = 1;

                num = [1 0];
                den = [p1 p];
            end
        else
            z = ((1+(R6/R5))/(1+(R3/R4)));
            p1 = (1/(R1*C1))*((1+(R6/R5))/(1+(R4/R3)));
            p = (R6/R5)/(R1*R2*C1*C2);

            num = [z 0 0];
            den = [1 p1 p];
        end
    case ' '
        z = -(((1+(R6/R5))/(1+(R3/R4)))*(1/(R1*C1)));
        p1 = (1/(R1*C1))*((1+(R6/R5))/(1+(R4/R3)));
        p = (R6/R5)/(R1*R2*C1*C2);

        num = [z 0];
        den = [1 p1 p];
end

transfer(num,den,Ws,TIPO,v,Q,N);
clc
```

KHN Bicuadrático

```matlab
function KHNB_OpeningFcn(hObject, eventdata, handles, varargin)

global bandera
global handles
N = varargin{1};
TIPO = varargin{2};
n = N;
if TIPO == ' '
    set(handles.TagEditN,'string',num2str(N*2))
else
    set(handles.TagEditN,'string',num2str(N))
end

global poles
global zeros
```

```matlab
global Qp
global Wnp
global Qz
global Wnz
global Wc

Wc;
if (bandera == 1|bandera==3)%%para filtro eliptico
    global num
    global den
    P = roots(den);
    Z = roots(num);
else
    P = poles;
    Z = zeros;
end

    Wnp = sqrt(((real(P)).^2)+(imag(P).^2));
    Qp = (Wnp./(2*(abs(real(P)))));
    %Qp = sort(Qp,'descend');

    Wnz = sqrt(((real(Z)).^2)+(imag(Z).^2));
    Qz = (Wnz./(2*(abs(real(Z)))));
    %Qz = sort(Qz,'ascend');

 %%%%metodo para no duplicar los valores de Q
switch TIPO
    case 'low'
        Qp(2:2:(n)) = [];
        Qp = sort(Qp,'descend');
        Wnp(2:2:(n)) = [];
        if bandera ~=1
            Wnp = sort(Wnp,'ascend');
        elseif mod(N,2)~=0%%si n es impar
            Wnp = sort(Wnp,'ascend');
        end
        %Wnp = sort(Wnp,'ascend')
        if (bandera == 4|bandera == 1)%%%%para el caso de chebyshev
inverso y eliptico
            if n == 3
                Wnz;
            elseif bandera == 1 %%eliptico

                Wnz3 = length(Wnz);
                Qz3 = length(Qz);
                if Wnz3 == n/2%%para caso par
                    Wnz(2:2:Wnz3) = [];
                    Wnz = sort(Wnz,'ascend');
                    Qz(2:2:Qz3) = [];
                else
                    Wnz(2:2:n)=[];
                    Qz(2:2:n)=[];
                end

                if length(Z) == length(P)
                    Z(2:2:n)=[];
                else
                    Wnzdim = length(Wnz);
                    for t=1:Wnzdim
                        prueb(t)=Wnz(t);
```

```matlab
                    end

                    valor=prueb(Wnzdim);
                    prueb(Wnzdim+1)=valor;
                    for t=1:(Wnzdim+1)
                        Wnz(t)=prueb(t);
                    end
                    Wnz(:)
                end
            else
                Wnz(2:2:n)=[];
            end
        end


    case 'high'
        Qp(2:2:(n)) = [];
        Wnp(2:2:(n)) = [];
        if bandera == 1
            Wnp = sort(Wnp,'descend');
        else
            Wnp = sort(Wnp,'ascend');
        end
        if (bandera == 4|bandera == 1|bandera==0)%%%%para el caso de
chebyshev inverso,eliptico
            if (bandera == 1|bandera==0)
                if length(Z) == length(P)
                    Wnz(2:2:n)=[];
                    Qz(2:2:n)=[];
                else
                    Wnz(2:2:n)=[];
                %Wnz = sort(Wnz,'ascend');
                    Wnzdim = length(Wnz);
                    for t=1:Wnzdim
                        prueb(t)=Wnz(t);
                    end
                    valor=prueb(Wnzdim);
                    prueb(Wnzdim)=[];
                    prueb = sort(prueb,2,'ascend');
                    prueb(Wnzdim)=valor;
                    for t=1:Wnzdim
                        Wnz(t)=prueb(t);
                    end
                    Qz(2:2:(n)) = [];
                %Qz = sort(Qz,'ascend')
                    Qzdim = length(Qz);
                    for t=1:Qzdim
                        pruebQz(t)=Qz(t);
                    end
                    valorQz=pruebQz(Qzdim);
                    pruebQz(Qzdim)=[];
                    pruebQz = sort(pruebQz,2,'ascend');
                    pruebQz(Qzdim)=valor;
                    for t=1:Qzdim
                        Qz(t)=pruebQz(t);
                    end
                end
            else
                Wnz(2:2:n)=[];
                Wnz = sort(Wnz,'ascend');
                Qz(2:2:n)=[];%%%para cheb-1
            end
```

```matlab
            end
    case ' '
            if (bandera == 4|bandera ==3)%%%para el caso de chebyshev
inverso

                Qp(2:2:(n*2)) = [];
                Wnp(2:2:(n*2)) = [];
                dimz = length(Z);
                Wnz(2:2:(dimz)) = [];
                %Wnz = sort(Wnz,'ascend');
                Qz(2:2:(dimz))=[];
            else
                Qp(2:2:(n*2)) = [];
                Wnp(2:2:(n*2)) = [];
            end
        %end
end


if (bandera == 4|bandera == 1|bandera==3|bandera==0)%%%para el caso de
chebyshev inverso,eliptico
    Q2p = num2str(Qp);
    Wn2p =num2str(Wnp);
    val1 = strcat(Wn2p, ' ,  ',Q2p);

    Q2z = num2str(Qz);
    Wn2z =num2str(Wnz);
    val2 = strcat(Wn2z, ' ,  ',Q2z);

    val = strcat(val1, '   ,  ',val2);
else
    Q2 = num2str(Qp);
    Wn2 =num2str(Wnp);
    val1 = strcat(Wn2, ' ,  ',Q2);

    Qz2 = num2str(Qz);
    Wz2 =num2str(Wnz);
    val2 = strcat(Wz2, ' ,  ',Qz2);

    val = strcat(val1,'  ,  ',val2);
end

set(handles.TagListboxWn,'string',num2str(val));
posval=get(handles.TagListboxWn,'value');
Qz(posval);
set(handles.TagEditWnp2,'string',num2str(Wnp(posval,:)))
set(handles.TagEditQp2,'string',num2str(Qp(posval,:)))

if bandera == 1 %%eliptico
    set(handles.TagEditWnz2,'string',num2str(Wnz(posval)))
    set(handles.TagEditQz2,'string',num2str(Qz(posval)))
else
    set(handles.TagEditWnz2,'string',num2str(Wnz(posval,:)))
    set(handles.TagEditQz2,'string',num2str(Qz(posval,:)))
end

C1 = str2num(get(handles.TagEditC,'String'));
C2 = C1;
R1 = 1./C1;
```

```matlab
R2 =1./C2;
R3 = 1;
R5 = R3;
R8 = R5;
R9 = R8;
R7 = (Wnz(posval)).^2;
R6 = (Wnp(posval)).^2;
R10 = (1+R7) * (Qz(posval)./sqrt(R7)) - 1;
R4 =  (1+R6) * ((Qp(posval))/(sqrt(R6))) - 1;


%%%%imprime los valores de salida
set(handles.TagEditC2,'string',num2str(C2));
set(handles.TagEditR1,'string',num2str(R1));
set(handles.TagEditR2,'string',num2str(R2));
set(handles.TagEditR3,'string',num2str(R3));
set(handles.TagEditR4,'string',num2str(R4));
set(handles.TagEditR5,'string',num2str(R5));
set(handles.TagEditR6,'string',num2str(R6));
set(handles.TagEditR7,'string',num2str(R7));
set(handles.TagEditR8,'string',num2str(R8));
set(handles.TagEditR9,'string',num2str(R9));
set(handles.TagEditR10,'string',num2str(R10));


handles.C1 = C1;
handles.C2 = C2;
handles.R1 = R1;
handles.R2 = R2;
handles.R3 = R3;
handles.R4 = R4;
handles.R5 = R5;
handles.R6 = R6;
handles.R7 = R7;
handles.R8 = R8;
handles.R9 = R9;
handles.R10 = R10;


switch TIPO
    case 'low'
        set(handles.text1,'string',num2str('Output Low Pass'));
    case 'high'
        set(handles.text1,'string',num2str('Output High Pass'));
    case ' '
        set(handles.text1,'string',num2str('Output Band Pass'));
end

T = ['khnb.jpg'];
[X,MAP] = IMREAD(T,'jpg');
subplot(handles.axes1)
image(X)
colormap(MAP)
axis off
axis equal
% Choose default command line output for KHNB
handles.output = hObject;

% Update handles structure
guidata(hObject, handles);

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

```matlab
function TagListboxWn_Callback(hObject, eventdata, handles)
global Qp
global Wnp
global Qz
global Wnz
global N
global Wc
global bandera
global handles
Wnz
s=get(handles.TagListboxWn,'value');

C1 = str2num(get(handles.TagEditC,'String'));
C2 = C1;
R1 = 1./C1;
R2 =1./C2;
R3 = 1;
R5 = R3;
R8 = R5;
R9 = R8;
R7 = (Wnz(s)).^2;
R6 = (Wnp(s)).^2;
R10 = (1+R7) * (Qz(s)./sqrt(R7)) - 1;
R4 =  (1+R6) * (Qp(s)./sqrt(R6)) - 1;

%%%%%imprime los valores de salida
set(handles.TagEditC2,'string',num2str(C2));
set(handles.TagEditR1,'string',num2str(R1));
set(handles.TagEditR2,'string',num2str(R2));
set(handles.TagEditR3,'string',num2str(R3));
set(handles.TagEditR4,'string',num2str(R4));
set(handles.TagEditR5,'string',num2str(R5));
set(handles.TagEditR6,'string',num2str(R6));
set(handles.TagEditR7,'string',num2str(R7));
set(handles.TagEditR8,'string',num2str(R8));
set(handles.TagEditR9,'string',num2str(R9));
set(handles.TagEditR10,'string',num2str(R10));

handles.C1(s) = C1;
handles.C2(s) = C2;
handles.R1(s) = R1;
handles.R2(s) = R2;
handles.R3(s) = R3;
handles.R4(s) = R4;
handles.R5(s) = R5;
handles.R6(s) = R6;
handles.R7(s) = R7;
handles.R8(s) = R8;
handles.R9(s) = R9;
handles.R10(s) = R10;

if mod(N,2)~=0
    if Qp(s)<=.5
        set(handles.TagEditC2,'enable','off')
        set(handles.TagEditR1,'enable','off')
        set(handles.TagEditR2,'enable','off')
        set(handles.TagEditR3,'enable','off')
        set(handles.TagEditR4,'enable','off')
        set(handles.TagEditR5,'enable','off')
        set(handles.TagEditR6,'enable','off')
        set(handles.TagEditR7,'enable','off')
```

```matlab
        set(handles.TagEditR8,'enable','off')
        set(handles.TagEditR9,'enable','off')
        set(handles.TagEditR10,'enable','off')
        warningpb(Wc)

    else
        set(handles.TagEditC2,'enable','on')
        set(handles.TagEditR1,'enable','on')
        set(handles.TagEditR2,'enable','on')
        set(handles.TagEditR3,'enable','on')
        set(handles.TagEditR4,'enable','on')
        set(handles.TagEditR5,'enable','on')
        set(handles.TagEditR6,'enable','on')
        set(handles.TagEditR7,'enable','on')
        set(handles.TagEditR8,'enable','on')
        set(handles.TagEditR9,'enable','on')
        set(handles.TagEditR10,'enable','on')


    end
end

set(handles.TagEditWnp2,'string',num2str(Wnp(s,:)))
set(handles.TagEditQp2,'string',num2str(Qp(s,:)))

if bandera == 1 %%eliptico
    set(handles.TagEditWnz2,'string',num2str(Wnz(s)))
    set(handles.TagEditQz2,'string',num2str(Qz(s)))
else
    set(handles.TagEditWnz2,'string',num2str(Wnz(s,:)))
    set(handles.TagEditQz2,'string',num2str(Qz(s,:)))
end
clc

function TagPushBack_Callback(hObject, eventdata, handles)
global bandera
global TIPO
close;
if bandera == 4 %%%%cheb inv
    actinvcheb(TIPO,2,3,4);
elseif (bandera == 1|bandera == 3); %%%eliptico
    activeEpb(TIPO,2,3,4,5,6);
else
    activeTT(TIPO,2,3,4,5,6);
end
clear global handles
clc

function pushbutton4_Callback(hObject, eventdata, handles)
global TIPO
global N
global handles
global bandera
global C
global R
handles
s = get(handles.TagListboxWn,'value');
delete respuesta.cir
diary respuesta.cir
fprintf('\n')
```

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```matlab
fprintf('.lib "nom.lib"\n')
fprintf('.AC DEC 100 .01 10\n')
fprintf('.PROBE V(*) I(*) W(*) D(*) NOISE(*)\n')
fprintf('v1 11 0 DC 0Vdc AC 1Vac \n')
switch TIPO
    case {'low','high'}
        for j = 1:(N/2)
            R1(s) = handles.R1(j);
            R2(s) = handles.R2(j);
            R3(s) = handles.R3(j);
            R4(s) = handles.R4(j);
            R5(s) = handles.R5(j);
            R6(s) = handles.R6(j);
            R7(s) = handles.R7(j);
            R8(s) = handles.R8(j);
            R9(s) = handles.R9(j);
            R10(s) = handles.R10(j);
            C1(s) = handles.C1(j);
            C2(s) = handles.C2(j);
            if j == 1
                fprintf('R3%d 1%d 2%d %f\n',j,j,j,R3(s))
                fprintf('E1%d 3%d 0 2%d 8%d 1meg\n',j,j,j,j)
                fprintf('R6%d 8%d 3%d %f\n',j,j,j,R6(s))
                fprintf('R1%d 3%d 4%d %f\n',j,j,j,R1(s))
                fprintf('C1%d 4%d 5%d %f\n',j,j,j,C1(s))
                fprintf('E2%d 5%d 0 0 4%d 1meg\n',j,j,j)
                fprintf('R2%d 5%d 6%d %f\n',j,j,j,R2(s))
                fprintf('C2%d 6%d 7%d %f\n',j,j,j,C2(s))
                fprintf('E3%d 7%d 0 0 6%d 1meg\n',j,j,j)
                fprintf('R5%d 8%d 7%d %f\n',j,j,j,R5(s))
                fprintf('R4%d 2%d 5%d %f\n',j,j,j,R4(s))
                if R10(s) ~= inf
                    fprintf('R10%d 5%d 9%d %f\n',j,j,j,R10(s))
                    fprintf('R9%d 9%d 11%d %f\n',j,j,j,R9(s))
                    fprintf('E4%d 11%d 0 10%d 9%d 1meg\n',j,j,j,j)
                else
                    fprintf('E4%d 11%d 0 10%d 0 1meg\n',j,j,j)
                end
                fprintf('R7%d 3%d 10%d %f\n',j,j,j,R7(s))
                fprintf('R8%d 7%d 10%d %f\n',j,j,j,R8(s))
                if mod(N,2)~=0
                    switch TIPO
                        case 'low'
                            fprintf('R%d 11%d 12%d %f\n',j,j,j,R)
                            fprintf('C%d 12%d 0 %f\n',j,j,C)
                        case 'high'
                            fprintf('C%d 11%d 12%d %f\n',j,j,j,C)
                            fprintf('R%d 12%d 0 %f\n',j,j,R)
                    end
                end
            else
                fprintf('R3%d 11%d 2%d %f\n',j,j-1,j,R3(s))
                fprintf('E1%d 3%d 0 2%d 8%d 1meg\n',j,j,j,j)
                fprintf('R6%d 8%d 3%d %f\n',j,j,j,R6(s))
                fprintf('R1%d 3%d 4%d %f\n',j,j,j,R1(s))
                fprintf('C1%d 4%d 5%d %f\n',j,j,j,C1(s))
                fprintf('E2%d 5%d 0 0 4%d 1meg\n',j,j,j)
                fprintf('R2%d 5%d 6%d %f\n',j,j,j,R2(s))
                fprintf('C2%d 6%d 7%d %f\n',j,j,j,C2(s))
                fprintf('E3%d 7%d 0 0 6%d 1meg\n',j,j,j)
                fprintf('R5%d 8%d 7%d %f\n',j,j,j,R5(s))
```

```matlab
                fprintf('R4%d 2%d 5%d %f\n',j,j,j,R4(s))
                if R10(s) ~= inf
                    fprintf('R10%d 5%d 9%d %f\n',j,j,j,R10(s))
                    fprintf('R9%d 9%d 11%d %f\n',j,j,j,R9(s))
                    fprintf('E4%d 11%d 0 10%d 9%d 1meg\n',j,j,j,j)
                else
                    fprintf('E4%d 11%d 0 10%d 0 1meg\n',j,j,j)
                end
                fprintf('R7%d 3%d 10%d %f\n',j,j,j,R7(s))
                fprintf('R8%d 7%d 10%d %f\n',j,j,j,R8(s))
                if mod(N,2)~=0
                    switch TIPO
                        case 'low'
                            fprintf('R%d 11%d 12%d %f\n',j,j,j,R)
                            fprintf('C%d 12%d 0 %f\n',j,j,C)
                        case 'high'
                            fprintf('C%d 11%d 12%d %f\n',j,j,j,C)
                            fprintf('R%d 12%d 0 %f\n',j,j,R)
                    end
                end
            end
        end
    end
case ' '
    for j = 1:N
        R1(s) = handles.R1(j);
        R2(s) = handles.R2(j);
        R3(s) = handles.R3(j);
        R4(s) = handles.R4(j);
        R5(s) = handles.R5(j);
        R6(s) = handles.R6(j);
        R7(s) = handles.R7(j);
        R8(s) = handles.R8(j);
        R9(s) = handles.R9(j);
        R10(s) = handles.R10(j);
        C1(s) = handles.C1(j);
        C2(s) = handles.C2(j);
        if j == 1
            fprintf('R3%d 1%d 2%d %f\n',j,j,j,R3(s))
            fprintf('E1%d 3%d 0 2%d 8%d 1meg\n',j,j,j,j)
            fprintf('R6%d 8%d 3%d %f\n',j,j,j,R6(s))
            fprintf('R1%d 3%d 4%d %f\n',j,j,j,R1(s))
            fprintf('C1%d 4%d 5%d %f\n',j,j,j,C1(s))
            fprintf('E2%d 5%d 0 0 4%d 1meg\n',j,j,j)
            fprintf('R2%d 5%d 6%d %f\n',j,j,j,R2(s))
            fprintf('C2%d 6%d 7%d %f\n',j,j,j,C2(s))
            fprintf('E3%d 7%d 0 0 6%d 1meg\n',j,j,j)
            fprintf('R5%d 8%d 7%d %f\n',j,j,j,R5(s))
            fprintf('R4%d 2%d 5%d %f\n',j,j,j,R4(s))
            if R10(s) ~= inf
                fprintf('R10%d 5%d 9%d %f\n',j,j,j,R10(s))
                fprintf('R9%d 9%d 11%d %f\n',j,j,j,R9(s))
                fprintf('E4%d 11%d 0 10%d 9%d 1meg\n',j,j,j,j)
            else
                fprintf('E4%d 11%d 0 10%d 0 1meg\n',j,j,j)
            end
            fprintf('R7%d 3%d 10%d %f\n',j,j,j,R7(s))
            fprintf('R8%d 7%d 10%d %f\n',j,j,j,R8(s))
        else
            fprintf('R3%d 11%d 2%d %f\n',j,j-1,j,R3(s))
            fprintf('E1%d 3%d 0 2%d 8%d 1meg\n',j,j,j,j)
            fprintf('R6%d 8%d 3%d %f\n',j,j,j,R6(s))
```

```matlab
                    fprintf('R1%d 3%d 4%d %f\n',j,j,j,R1(s))
                    fprintf('C1%d 4%d 5%d %f\n',j,j,j,C1(s))
                    fprintf('E2%d 5%d 0 0 4%d 1meg\n',j,j,j)
                    fprintf('R2%d 5%d 6%d %f\n',j,j,j,R2(s))
                    fprintf('C2%d 6%d 7%d %f\n',j,j,j,C2(s))
                    fprintf('E3%d 7%d 0 0 6%d 1meg\n',j,j,j)
                    fprintf('R5%d 8%d 7%d %f\n',j,j,j,R5(s))
                    fprintf('R4%d 2%d 5%d %f\n',j,j,j,R4(s))
                    if R10(s) ~= inf
                        fprintf('R10%d 5%d 9%d %f\n',j,j,j,R10(s))
                        fprintf('R9%d 9%d 11%d %f\n',j,j,j,R9(s))
                        fprintf('E4%d 11%d 0 10%d 9%d 1meg\n',j,j,j,j)
                    else
                        fprintf('E4%d 11%d 0 10%d 0 1meg\n',j,j,j)
                    end
                    fprintf('R7%d 3%d 10%d %f\n',j,j,j,R7(s))
                    fprintf('R8%d 7%d 10%d %f\n',j,j,j,R8(s))
                end
            end
end
if TIPO == ' '
    j = N;
    fprintf('.print AC V(11%d)\n',j)
else
    if mod(N,2)~=0
        j = int8((N/2)-1);
        fprintf('.print AC V(12%d)\n',j)
    else
        j = N/2;
        fprintf('.print AC V(11%d)\n',j)
    end
end

fprintf('.end')
diary off

!C:/Orcad/PSpice/pspice.exe run C:/elip3/respuesta.cir


function pushbutton5_Callback(hObject, eventdata, handles)
global Ws
global ws
global TIPO
global handles
global Wc
global N
global Q
global bandera

v = get(handles.TagListboxWn,'value');

            R4 = handles.R4(v);
            R6 = handles.R6(v);
            R7 = handles.R7(v);
            R10 = handles.R10(v);

            z2 = (1+R10)/(1+R7);
            z1 = (1+R7)/(1+R10);
            z = R7;
```

```matlab
p2 = (1+R4)/(1+R6);
p1 = (1+R6)/(1+R4);
p = R6;

num = [z2 z1 z];
den = [p2 p1 p];

if mod(N,2)~=0
    if Q(v)<=.5
        switch TIPO
            case 'low'
                global C
                C;
                R = 1/(Wc*C);
                p1 = R;
                p = 1;

                num = [0 1];
                den = [p1 p];
            case 'high'
                global C
                C;
                R = 1/(Wc*C);
                p1 = R;
                p = 1;

                num = [1 0];
                den = [p1 p];
        end
    end
end
if bandera == 4
    Ws;
elseif bandera == 0
    Ws = Wc;
else
    Ws = ws;
end

transfer(num,den,Ws,TIPO,v,Q,N);
```