

Apéndice C

Lista del programa del Filtro de Retroalimentación Múltiple
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Apéndice C

Listado del Programa: Retroalimentación Múltiple

```
function retromulpb_OpeningFcn(hObject, eventdata, handles, varargin)
N = varargin{1};
TIPO = varargin{2};
n = N;

global bandera

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

global poles
global Q
global Wn
global Wc
global handles

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

%%%%metodo para no duplicar los valores de Q
if TIPO == ' '
    Q(2:2:(n*2)) = [];
    Wn(2:2:(n*2)) = [];
    Q2 = num2str(Q);
    Wn2 = num2str(Wn);
    val = strcat(Wn2, ' , ', Q2);
else
    Q(2:2:(n)) = [];
    Wn(2:2:(n)) = [];
    Q2 = num2str(Q);
    Wn2 = num2str(Wn);
    val = strcat(Wn2, ' , ', Q2);
end

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, :)))

switch TIPO
    case 'low'
        Ho = str2num(get(handles.TagEditHo, 'String'));
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C = str2num(get(handles.TagEditC, 'String'));
C5 = C;
m = 1./(((4)*(Q(posval)).^2)*(1+abs(Ho)));
C6 = m*C;
R2 = ((1./(2*Wn(posval)*C*m*Q(posval)))*(1 + sqrt(1-
4*m*(Q(posval).^2)*(1+abs(Ho)))));
R1 = R2./abs(Ho);
R3 = 1./((Wn(posval).^2)*(C.^2)*R2*m);

%%%%imprime los valores de salida
set(handles.text11, 'string', num2str('C5 ='));
set(handles.text9, 'string', num2str('C6 ='));
set(handles.text13, 'string', num2str('R1 ='));
set(handles.text15, 'string', num2str('R2 ='));
set(handles.text17, 'string', num2str('R3 ='));
set(handles.text1, 'string', num2str('Output low Pass'));

set(handles.TagEditR1, 'string', num2str(R1));
set(handles.TagEditR2, 'string', num2str(R2));
set(handles.TagEditR3, 'string', num2str(R3));
set(handles.TagEditC5, 'string', num2str(C5));
set(handles.TagEditC6, 'string', num2str(C6));

handles.R1 = R1;
handles.R2 = R2;
handles.R3 = R3;
handles.C5 = C5;
handles.C6 = C6;
T = ['retropb.jpg'];
case 'high'
Ho = str2num(get(handles.TagEditHo, 'String'));
C = str2num(get(handles.TagEditC, 'String'));

C1 = C;
C3 = C1;
R5 = abs(Ho)./((Wn(posval))*Q(posval))*C*(2*abs(Ho)+1));
R6 = (2*abs(Ho)+1)*Q(posval)./((Wn(posval))*C);
C2 = C./abs(Ho);

%%%%imprime los valores de salida
set(handles.text11, 'string', num2str('R5 ='));
set(handles.text9, 'string', num2str('R6 ='));
set(handles.text13, 'string', num2str('C1 ='));
set(handles.text15, 'string', num2str('C2 ='));
set(handles.text17, 'string', num2str('C3 ='));
set(handles.text1, 'string', num2str('Output High Pass'));

set(handles.TagEditR1, 'string', num2str(C1));
set(handles.TagEditR2, 'string', num2str(C2));
set(handles.TagEditR3, 'string', num2str(C3));
set(handles.TagEditC5, 'string', num2str(R5));
set(handles.TagEditC6, 'string', num2str(R6));

handles.C1 = C1;
handles.C2 = C2;
handles.C3 = C3;

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handles.R5 = R5;
handles.R6 = R6;

T = ['retropa.jpg'];
case ' '
Ho1 = 2 * (Q(posval))^2;

Ho = str2num(get(handles.TagEditHo, 'String'));
C = str2num(get(handles.TagEditC, 'String'));
Ho
Ho1
C2 = C;
C3 = C;
R1 = ((Q(posval))./(Wn(posval))*C*(abs(Ho)));
r5 = (2* (Q(posval)).^2 - abs(Ho)) * ((Wn(posval))) * C;
R5 = (Q(posval))./r5;
%%%R5 debe ser positiva, Ho < 2Q^2
R6 = ((2*Q(posval))./(Wn(posval)*C));
%%%imprime los valores de salida
set(handles.text11, 'string', num2str('C2 ='));
set(handles.text9, 'string', num2str('C3 ='));
set(handles.text13, 'string', num2str('R1 ='));
set(handles.text15, 'string', num2str('R5 ='));
set(handles.text17, 'string', num2str('R6 ='));
set(handles.text1, 'string', num2str('Output Band Pass'));

set(handles.TagEditC5, 'string', num2str(C2));
set(handles.TagEditC6, 'string', num2str(C3));
set(handles.TagEditR1, 'string', num2str(R1));
set(handles.TagEditR2, 'string', num2str(R5));
set(handles.TagEditR3, 'string', num2str(R6));

handles.C2 = C2;
handles.C3 = C3;
handles.R1 = R1;
handles.R5 = R5;
handles.R6 = R6;

T = ['retropBa.jpg'];
end

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

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

% Update handles structure
guidata(hObject, handles);

```

```

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 TagListboxWn_Callback(hObject, eventdata, handles)
global Q
global TIPO
global N
global Wc
global handles

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

switch TIPO
    case 'low'
        global Wn
        Ho = str2num(get(handles.TagEditHo, 'String'));
        C = str2num(get(handles.TagEditC, 'String'));
        C5 = C;
        m = 1./(((4)*(Q(s)).^2)*(1+abs(Ho)));
        C6 = m*C;
        R2 = ((1./(2*Wn(s)*C*m*Q(s)))*(1 + sqrt(1-
4*m*(Q(s).^2)*(1+abs(Ho)))));
        R1 = R2./abs(Ho);
        R3 = 1./((Wn(s).^2)*(C.^2)*R2*m);

        %%%imprime los valores de salida
        set(handles.text11, 'string', num2str('C5 ='));
        set(handles.text9, 'string', num2str('C6 ='));
        set(handles.text13, 'string', num2str('R1 ='));
        set(handles.text15, 'string', num2str('R2 ='));
        set(handles.text17, 'string', num2str('R3 ='));
        set(handles.text1, 'string', num2str('Output low Pass'));

        set(handles.TagEditR1, 'string', num2str(R1));
        set(handles.TagEditR2, 'string', num2str(R2));
        set(handles.TagEditR3, 'string', num2str(R3));
        set(handles.TagEditC5, 'string', num2str(C5));
        set(handles.TagEditC6, 'string', num2str(C6));

        handles.R1(s) = R1;
        handles.R2(s) = R2;
        handles.R3(s) = R3;
        handles.C5(s) = C5;
        handles.C6(s) = C6;
        clc

```

```

case 'high'
    global Wn
    Ho = str2num(get(handles.TagEditHo, 'String'));
    C = str2num(get(handles.TagEditC, 'String'));

    C1 = C;
    C3 = C1;
    R5 = abs(Ho) ./ ((Wn(s)) * (Q(s)) * C * (2*abs(Ho)+1));
    R6 = (2*abs(Ho)+1) * (Q(s)) ./ ((Wn(s)) * C);
    C2 = C ./ abs(Ho);

    %%%imprime los valores de salida
    set(handles.text11, 'string', num2str('R5 ='));
    set(handles.text9, 'string', num2str('R6 ='));
    set(handles.text13, 'string', num2str('C1 ='));
    set(handles.text15, 'string', num2str('C2 ='));
    set(handles.text17, 'string', num2str('C3 ='));
    set(handles.text1, 'string', num2str('Output High Pass'));

    set(handles.TagEditR1, 'string', num2str(C1));
    set(handles.TagEditR2, 'string', num2str(C2));
    set(handles.TagEditR3, 'string', num2str(C3));
    set(handles.TagEditC5, 'string', num2str(R5));
    set(handles.TagEditC6, 'string', num2str(R6));

    handles.C1(s) = C1;
    handles.C2(s) = C2;
    handles.C3(s) = C3;
    handles.R5(s) = R5;
    handles.R6(s) = R6;
    clc
case ' '
    global Wn
    Ho1 = 2 * (Q(s))^2;

    Ho = str2num(get(handles.TagEditHo, 'String'));
    C = str2num(get(handles.TagEditC, 'String'));
    Ho
    Ho1
    C2 = C;
    C3 = C;
    R1 = ((Q(s)) ./ ((Wn(s)) * C * (abs(Ho))));
    r5 = (2* (Q(s)).^2 - abs(Ho)) * ((Wn(s)) * C);
    R5 = (Q(s)) ./ r5;
    %%%R5 debe ser positiva, Ho < 2Q^2
    R6 = ((2*Q(s)) ./ (Wn(s) * C));
    %%%imprime los valores de salida
    set(handles.text11, 'string', num2str('C2 ='));
    set(handles.text9, 'string', num2str('C3 ='));
    set(handles.text13, 'string', num2str('R1 ='));
    set(handles.text15, 'string', num2str('R5 ='));
    set(handles.text17, 'string', num2str('R6 ='));
    set(handles.text1, 'string', num2str('Output Band Pass'));

    set(handles.TagEditC5, 'string', num2str(C2));
    set(handles.TagEditC6, 'string', num2str(C3));

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set(handles.TagEditR1, 'string', num2str(R1));
set(handles.TagEditR2, 'string', num2str(R5));
set(handles.TagEditR3, 'string', num2str(R6));

handles.R1(s) = R1;
handles.R5(s) = R5;
handles.R6(s) = R6;
handles.C2(s) = C2;
handles.C3(s) = C3;
clc

end
%%%imprime los valores de salida
if mod (N,2)~=0
    if Q(s)<=.5
        set(handles.TagEditR1, 'enable', 'off')
        set(handles.TagEditR2, 'enable', 'off')
        set(handles.TagEditR3, 'enable', 'off')
        set(handles.TagEditC5, 'enable', 'off')
        set(handles.TagEditC6, 'enable', 'off')
        warningpb(Wc)

    else
        set(handles.TagEditR1, 'enable', 'on')
        set(handles.TagEditR2, 'enable', 'on')
        set(handles.TagEditR3, 'enable', 'on')
        set(handles.TagEditC5, 'enable', 'on')
        set(handles.TagEditC6, 'enable', 'on')
    end
end

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

function pushbutton4_Callback(hObject, eventdata, handles)
global TIPO
global N
global handles
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'
    for j = 1:(N/2)
        R1(s) = handles.R1(j);
        R2(s) = handles.R2(j);
        R3(s) = handles.R3(j);
        C5(s) = handles.C5(j);

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C6(s) = handles.C6(j);

if j == 1
    fprintf('R1%d 1%d 2%d %f\n',j,j,j,R1(s))
    fprintf('R2%d 2%d 4%d %f\n',j,j,j,R2(s))
    fprintf('R3%d 2%d 3%d %f\n',j,j,j,R3(s))
    fprintf('C5%d 2%d 0 %f\n',j,j,C5(s))
    fprintf('C6%d 3%d 4%d %f\n',j,j,j,C6(s))
    fprintf('E1%d 4%d 0 0 3%d 1meg\n',j,j,j)
    if mod(N,2)~=0
        fprintf('R%d 4%d 5%d %f\n',j,j,j,R)
        fprintf('C%d 5%d 0 %f\n',j,j,C)
    end
else
    fprintf('R1%d 4%d 2%d %f\n',j,j-1,j,R1(s))
    fprintf('R2%d 2%d 4%d %f\n',j,j,j,R2(s))
    fprintf('R3%d 2%d 3%d %f\n',j,j,j,R3(s))
    fprintf('C5%d 2%d 0 %f\n',j,j,C5(s))
    fprintf('C6%d 4%d 3%d %f\n',j,j,j,C6(s))
    fprintf('E1%d 4%d 0 0 3%d 1meg\n',j,j,j)
    if mod(N,2)~=0
        fprintf('R%d 4%d 5%d %f\n',j,j,j,R)
        fprintf('C%d 5%d 0 %f\n',j,j,C)
    end
end
end
case 'high'
for j = 1:(N/2)
    C1(s) = handles.C1(j);
    C2(s) = handles.C2(j);
    C3(s) = handles.C3(j);
    R5(s) = handles.R5(j);
    R6(s) = handles.R6(j);

    if j == 1
        fprintf('C1%d 1%d 2%d %f\n',j,j,j,C1(s))
        fprintf('C2%d 2%d 4%d %f\n',j,j,j,C2(s))
        fprintf('C3%d 2%d 3%d %f\n',j,j,j,C3(s))
        fprintf('R5%d 2%d 0 %f\n',j,j,R5(s))
        fprintf('R6%d 4%d 3%d %f\n',j,j,j,R6(s))
        fprintf('E1%d 4%d 0 0 3%d 1meg\n',j,j,j)
        if mod(N,2)~=0
            fprintf('C%d 4%d 5%d %f\n',j,j,j,C)
            fprintf('R%d 5%d 0 %f\n',j,j,R)
        end
    end
else
    fprintf('C1%d 4%d 2%d %f\n',j,j-1,j,C1(s))
    fprintf('C2%d 2%d 4%d %f\n',j,j,j,C2(s))
    fprintf('C3%d 2%d 3%d %f\n',j,j,j,C3(s))
    fprintf('R5%d 2%d 0 %f\n',j,j,R5(s))
    fprintf('R6%d 4%d 3%d %f\n',j,j,j,R6(s))
    fprintf('E1%d 4%d 0 0 3%d 1meg\n',j,j,j)
    if mod(N,2)~=0
        fprintf('C%d 4%d 5%d %f\n',j,j,j,C)
        fprintf('R%d 5%d 0 %f\n',j,j,R)
    end
end
end

```



```

        end
    end
end
case ' '
    for j = 1:N
        R1(s) = handles.R1(j);
        R5(s) = handles.R5(j);
        R6(s) = handles.R6(j);
        C2(s) = handles.C2(j);
        C3(s) = handles.C3(j);

        if j == 1
            fprintf('R1%d 1%d 2%d %f\n',j,j,j,R1(s))
            fprintf('C3%d 2%d 3%d %f\n',j,j,j,C3(s))
            fprintf('C2%d 2%d 4%d %f\n',j,j,j,C2(s))
            fprintf('R5%d 2%d 0 %f\n',j,j,R5(s))
            fprintf('R6%d 3%d 4%d %f\n',j,j,j,R6(s))
            fprintf('E1%d 4%d 0 0 3%d 1meg\n',j,j,j)
        else
            fprintf('R1%d 4%d 2%d %f\n',j,j-1,j,R1(s))
            fprintf('C3%d 2%d 3%d %f\n',j,j,j,C3(s))
            fprintf('C2%d 2%d 4%d %f\n',j,j,j,C2(s))
            fprintf('R5%d 2%d 0 %f\n',j,j,R5(s))
            fprintf('R6%d 3%d 4%d %f\n',j,j,j,R6(s))
            fprintf('E1%d 4%d 0 0 3%d 1meg\n',j,j,j)
        end
    end
end

end
if TIPO == ' '
    j=N;
    fprintf('.print AC V(4%d)\n',j)
    fprintf('.end')
    diary off
else
    if mod(N,2)~=0
        j = int8((N/2)-1);
        fprintf('.print AC V(5%d)\n',j)
    else
        j = N/2;
        fprintf('.print AC V(4%d)\n',j)
    end
    fprintf('.end')
    diary off
end

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

clc

function TagFT_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');

switch TIPO
    case 'low'
        R1 = handles.R1(v);
        R2 = handles.R2(v);
        R3 = handles.R3(v);
        C5 = handles.C5(v);
        C6 = handles.C6(v);

        z = -1/(R1*R3*C5*C6);
        p1 = ((1/C5)*(1/R1 + 1/R2 + 1/R3));
        p = (1/(R2*R3*C5*C6));

        num = [0 z];
        den = [1 p1 p];
        if mod (N,2)~=0
            if Q(v)<=.5
                global C
                C;
                R = 1/(Wc*C);
                p1 = R;
                p = 1;

                num = [0 1];
                den = [p1 p];
            end
        end
    case 'high'
        C1 = handles.C1(v);
        C2 = handles.C2(v);
        C3 = handles.C3(v);
        R5 = handles.R5(v);
        R6 = handles.R6(v);

        z = -(C1/C2);
        p1 = (1/R6)*((C1/(C2*C3))+(1/C2)+(1/C3));
        p = 1/(R5*R6*C2*C3);

        num = [z 0 0];
        den = [1 p1 p];
        if mod (N,2)~=0
            if Q(v)<=.5
                global C
                C;
                R = 1/(Wc*C);
                p1 = R;
            end
        end
    end
end

```

```

        p = 1;

        num = [1 0];
        den = [p1 p];
    end
end
case ' '
    R1 = handles.R1(v);
    R5 = handles.R5(v);
    R6 = handles.R6(v);
    C2 = handles.C2(v);
    C3 = handles.C3(v);

    z = -(1 / (R1*C2));
    p1 = ((1/(R6*C3))+(1/(R6*C2)));
    p = (1/(R6*C2*C3))*(1/R1)+(1/R5));

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

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

```

Deliyannis Friend

```

function MFBDF_OpeningFcn(hObject, eventdata, handles, varargin)
N = varargin{1};
Bn = varargin{2};
An = varargin{3};
Ws = varargin{4};
handles.Type = varargin{5};
TIPO = handles.Type;
if TIPO == ' '
    set(handles.TagEditN,'string',num2str(N*2))
else
    set(handles.TagEditN,'string',num2str(N))
end
n = N;
global poles
global zeros
global Q
global Wn
global Wc
global Z
global bandera

if bandera == 1 %%eliptico
    global Bn2
    Bn2 = num2str(Bn);
end

if (bandera == 1|bandera==3)%%para filtro eliptico
    global num

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```

    global den
    P = roots(den);
    Z = roots(num);
elseif bandera == 4
    P = roots(An);
    Z = roots(Bn);
else
    P = poles;
    Z = zeros;
end

global Wnz
Wn = sqrt(((real(P)).^2)+(imag(P).^2));
Wnz = (sqrt(((real(Z)).^2)+(imag(Z).^2)));
Q = (Wn./(2*(abs(real(P))));
Qz = 1./2*cos(atan(imag(Z)./(real(Z))));
%%%%metodo para no duplicar los valores de Q y wn, y Z
switch TIPO
case 'low'
    Q(2:2:(n)) = [] ;
    if bandera ~= 1 %%eliptico
        Q = sort(Q, 'descend');
    elseif mod(N,2)~=0%%si n es impar
        Q = sort(Q, 'descend');
    end

    Wn(2:2:(n)) = [];
    if bandera ~=1
        Wn = sort(Wn, 'ascend');
    elseif mod(N,2)~=0%%si n es impar
        Wn = sort(Wn, 'ascend');
    end

    if (bandera == 1|bandera==4)%%eliptico
        Wnz3 = length(Wnz);
        if (Wnz3 == (n/2))|(mod(N,2)~=0)
            Wnz;
            Wnz = sort(Wnz, 'ascend');
            Qz;
        else
            Wnz2 = length(Wnz);
            Wnz(2:2:Wnz2) = [];
            Wnz = sort(Wnz, 'ascend');
            Qz(2:2:Wnz2) = [];
        end
    else
        Qz(2:2:(n)) = [];
        Wnz(2:2:(n)) = [];
        Wnz = sort(Wnz, 'ascend');
    end

    Z1 = imag(Z);
    if length(Z) == length(P)
        Z(2:2:n)=[];
    else
        if (bandera == 1)|(bandera==2)

```

```

    if bandera==2
        Wc = 1;
    end

    if mod(N,2)==0%%si n es par
        x = (n/2);
    else
        x=int8(n/2)-1;

    end

    if length(Z) == (n/2)
        Z;
    elseif mod(N,3)~=0

        Zdim = length(Z);
        for t=1:Zdim
            pruebZ(t)=Z(t);
        end

        valorZ=pruebZ(Zdim);
        pruebZ(Zdim+1)=valorZ;
        for t=1:(Zdim+1)
            Z(t)=pruebZ(t);
        end
        Z(2:2:n)=[];
        Z(:);
    else
        for t=1:(n-x)
            if Z1(t)<=0
                Z(t:1:(n-2)) = []
            end
        end
    end

    elseif bandera == 4
        Z;
    else
        Z(2:2:n)=[];
    end
end
case 'high'
Q(2:2:(n)) = [] ;
Wn(2:2:(n)) = [];
if bandera == 1
    Wn
else
    Wn = sort(Wn, 'ascend');
end
Qz(2:2:(n)) = [];
Wnz(2:2:(n)) = [];
if length(Z) == length(P)
    Z(2:2:n)=[];
    Z1 = imag(Z)
else

```

```

        if (bandera == 1)|(bandera==2)
            if bandera==2
                Wc = 1
            end
            x=int8(n/2)-1;
            for t=1:(n-x)
                if Z1(t)<=0
                    Z(t:1:(n-2)) = []
                end
            end
        end
    end
end
case ' '
    global bn
    bn = num2str(Bn);
    if (bandera == 4|bandera ==3)%%%para el caso de chebyshev
inverso
        Q(2:2:(n*2)) = [];
        Wn(2:2:(n*2)) = [];
        dimz = length(Z);
        Wnz(2:2:(dimz)) = [];
        Wnz = sort(Wnz, 'ascend');
        Qz(2:2:(dimz))=[];
        Z(2:2:(dimz))=[];
    else
        Q(2:2:(n*2)) = [];
        Wn(2:2:(n*2)) = [];
    end
end
end
Z2 = num2str(Z);
Q2 = num2str(Q);
Wn2 =num2str(Wn);
val = strcat(Wn2, ' ', ' ', Q2, ' ', ' ', Z2);

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, :)))
set(handles.TagEditZ2, 'string', num2str(Z(posval, :)))

%Z1 = imag(Z);
C1 = str2num(get(handles.TagEditC1, 'String'));
a = (Wn(posval)/Q(posval));
b = (Wn(posval).^2);
%%%c tiene que ser < 1
i=1;
while i<=length(Bn)
    if Bn(i) ~= 0
        Bn1=Bn(i);
        break
    else
        i=i+1;
    end
end
end
end

```

```

c1 = Bn1/10;
e1 = ((Wnz(posval).^2)*Bn1)./10;
if c1 >= 1
    while c1>1
        c1 = c1./10;
        e1 = e1./10;
    end
end
c1;
e1;
d = 0;
K = .1;
x1 = (2*K)./(-a + sqrt(a.^2 + 8*K*b));
x22 = (c1 + (2 * e1 * (x1).^2) - (d * x1))./(1+K);
%para evitar el valor negativo de R4, si x2>1, se deben reducir los
valores
%de los coheficientes de c,d y e
x2 = x22;
if x2>1
    while c1>1
        c1=c1./2;
        e1=e1./2;
    end
    c = c1;
    e = e1;
    x2 = (c + (2 * e * (x1).^2) - (d * x1))./(1+K);
    while x2>1
        x2 = x2./2;
    end
end
c = c1;
e = e1;

RA = (K./ (1-c));
RB = 1;
RC = (K./c);
R1 = (x1./x2);
R4 = (x1./(1-x2));
%y1 tiene que ser 0<=y1<=1
y1 = 0;
y2 = ((1+K)*(c-y1))./(x1*b*((e./b)-c));
if y2 < 0
    y1 = 1;
    y2 = ((1+K)*(c-y1)) ./ (x1*b*((e/b)-c));
end
R2 = (y2./(x1*y2*b+K));
R3 = (y2./y1);
R5 = y2 ./ (1-(y2/R3));
C2 = C1;

%%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.TagEditRB, 'string', num2str(RB));
%set(handles.TagEditK, 'string', num2str(K));
set(handles.TagEditRA, 'string', num2str(RA));

```

```

set(handles.TagEditRC, 'string', num2str(RC));
set(handles.TagEditR3, 'string', num2str(R3));
set(handles.TagEditR4, 'string', num2str(R4));
set(handles.TagEditR5, 'string', num2str(R5));
set(handles.text1, 'string', num2str(TIPO));
global handles
handles.C1 = C1;
handles.C2 = C2;
handles.R1 = R1;
handles.R2 = R2;
handles.RA = RA;
handles.RB = RB;
handles.RC = RC;
handles.R3 = R3;
handles.R4 = R4;
handles.R5 = R5;

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

function TagPushBack_Callback(hObject, eventdata, handles)

global bandera
global TIPO
global Ws
close;
if bandera == 4 %%%chen inverso
    actinvcheb(handles.Type,2,3,Ws);
elseif (bandera == 1|bandera == 3) %%%eliptico
    activeEpb(TIPO,2,3,4,5,6);
else
    activeTT(1,2,3,4,5,6);
end
clear global handles

% --- Executes on selection change in TagListboxWn.
function TagListboxWn_Callback(hObject, eventdata, handles)
% hObject    handle to TagListboxWn (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: contents = get(hObject,'String') returns TagListboxWn contents
as cell array
%         contents{get(hObject,'Value')} returns selected item from
TagListboxWn

global N
global Q
global Wn
global Wnz
global Wc

```



```

global Bn
global bandera
global handles
TIPO = handles.Type;
s=get(handles.TagListboxWn, 'value');

if TIPO == ' '
    global bn
    Bn = str2num(bn);
end
C1 = str2num(get(handles.TagEditC1, 'String'));
a = (Wn(s)/Q(s));
b = (Wn(s).^2);
%%c tiene que ser < 1
if bandera == 1%%eliptico
    global Bn2
    Bn = str2num(Bn2)
end

i=1;
while i<=length(Bn)
    if Bn(i) ~= 0
        Bn1=Bn(i);
        break
    else
        i=i+1;
    end
end

c1 = Bn1/10;
Wnz
Wnz(s)
e1 = ((Wnz(s).^2)*Bn1)./10;
if c1 >= 1
    while c1>1
        c1 = c1./10;
        e1 = e1./10;
    end
end
c1;
e1;
d = 0;
K = .1;
x1 = (2*K)./(-a + sqrt(a.^2 + 8*K*b));
x22 = (c1 + (2 * e1 * (x1).^2) - (d * x1))./(1+K);
%para evitar el valor negativo de R4, si x2>1, se deben reducir los
valores
%de los coheficientes de c,d y e
x2 = x22;
if x2>1
    while c1>1
        c1=c1./2;
        e1=e1./2;
    end
    c = c1;
    e = e1;
end

```

```

        x2 = (c + (2 * e * (x1).^2) - (d * x1))./(1+K);
        while x2>1
            x2 = x2./2;
        end
    end
    c = c1;
    e = e1;

RA = (K./ (1-c));
RB = 1;
RC = (K./c);
R1 = (x1./x2);
R4 = (x1./(1-x2));
%y1 tiene que ser 0<=y1<=1
y1 = 0;
y2 = ((1+K)*(c-y1))./(x1*b*((e./b)-c));
if y2 < 0
    y1 = 1;
    y2 = ((1+K)*(c-y1)) ./ (x1*b*((e./b)-c));
end
R2 = (y2./(x1*y2*b+K));
R3 = (y2./y1);
R5 = y2 ./ (1-(y2/R3));
C2 = C1;

%%%%%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.TagEditRB, 'string', num2str(RB));
set(handles.TagEditRA, 'string', num2str(RA));
set(handles.TagEditRC, 'string', num2str(RC));
set(handles.TagEditR3, 'string', num2str(R3));
set(handles.TagEditR4, 'string', num2str(R4));
set(handles.TagEditR5, 'string', num2str(R5));
set(handles.text1, 'string', num2str(TIPO));

handles.C1(s) = C1;
handles.C2(s) = C2;
handles.R1(s) = R1;
handles.R2(s) = R2;
handles.RA(s) = RA;
handles.RB(s) = RB;
handles.RC(s) = RC;
handles.R3(s) = R3;
handles.R4(s) = R4;
handles.R5(s) = R5;

if mod(N,2)~=0
    if Q(s)<=.5
        set(handles.TagEditC2, 'enable', 'off')
        set(handles.TagEditR1, 'enable', 'off')
        set(handles.TagEditR2, 'enable', 'off')
        set(handles.TagEditRB, 'enable', 'off')
        set(handles.TagEditRA, 'enable', 'off')
        set(handles.TagEditRC, 'enable', 'off')
    end
end

```

```

        set(handles.TagEditR3,'enable','off')
        set(handles.TagEditR4,'enable','off')
        set(handles.TagEditR5,'enable','off')
        set(handles.TagEditC1,'enable','off')
        warningpb(Wc)

    else
        set(handles.TagEditC2,'enable','on')
        set(handles.TagEditR1,'enable','on')
        set(handles.TagEditR2,'enable','on')
        set(handles.TagEditRB,'enable','on')
        set(handles.TagEditRA,'enable','on')
        set(handles.TagEditRC,'enable','on')
        set(handles.TagEditR3,'enable','on')
        set(handles.TagEditR4,'enable','on')
        set(handles.TagEditR5,'enable','on')
        set(handles.TagEditC1,'enable','on')
    end
end
clc

function pushbutton5_Callback(hObject, eventdata, handles)
global N
global handles
global bandera
global C
global R
TIPO = handles.Type;
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)
            C1(s) = handles.C1(j);
            C2(s) = handles.C2(j);
            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);
            RA(s) = handles.RA(j);
            RB(s) = handles.RB(j);
            RC(s) = handles.RC(j);
            if j == 1
                fprintf('R1%d 1%d 2%d %f\n',j,j,j,R1(s))
                fprintf('C1%d 2%d 3%d %f\n',j,j,j,C1(s))
                fprintf('C2%d 2%d 4%d %f\n',j,j,j,C2(s))
                fprintf('R2%d 3%d 4%d %f\n',j,j,j,R2(s))
                fprintf('E1%d 4%d 0 5%d 3%d 1meg\n',j,j,j,j)
            end
        end
    end
end

```

```

fprintf('RB%d 4%d 5%d %f\n',j,j,j,RB(s))
fprintf('RA%d 5%d 0 %f\n',j,j,RA(s))
switch TIPO
    case 'low'
        fprintf('R5%d 3%d 0 %f\n',j,j,R5(s))
    case 'high'
        fprintf('R3%d 1%d 3%d %f\n',j,j,j,R3(s))
end
fprintf('R4%d 2%d 0 %f\n',j,j,R4(s))
fprintf('RC%d 1%d 5%d %f\n',j,j,j,RC(s))
if mod(N,2)~=0
    fprintf('R%d 4%d 6%d %f\n',j,j,j,R)
    fprintf('C%d 6%d 0 %f\n',j,j,C)
end
else
fprintf('R1%d 4%d 2%d %f\n',j,j-1,j,R1(s))
fprintf('C1%d 2%d 3%d %f\n',j,j,j,C1(s))
fprintf('C2%d 2%d 4%d %f\n',j,j,j,C2(s))
fprintf('R2%d 3%d 4%d %f\n',j,j,j,R2(s))
fprintf('E1%d 4%d 0 5%d 3%d 1meg\n',j,j,j,j)
fprintf('RB%d 4%d 5%d %f\n',j,j,j,RB(s))
fprintf('RA%d 5%d 0 %f\n',j,j,RA(s))
switch TIPO
    case 'low'
        fprintf('R5%d 3%d 0 %f\n',j,j,R5(s))
    case 'high'
        fprintf('R3%d 4%d 3%d %f\n',j,j-1,j,R3(s))
end
fprintf('R4%d 2%d 0 %f\n',j,j,R4(s))
fprintf('RC%d 4%d 5%d %f\n',j,j-1,j,RC(s))
if mod(N,2)~=0
    fprintf('R%d 4%d 6%d %f\n',j,j,j,R)
    fprintf('C%d 6%d 0 %f\n',j,j,C)
end
end
end
case ' '
for j = 1:N
    C1(s) = handles.C1(j);
    C2(s) = handles.C2(j);
    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);
    RA(s) = handles.RA(j);
    RB(s) = handles.RB(j);
    RC(s) = handles.RC(j);
    if j == 1
        fprintf('R1%d 1%d 2%d %f\n',j,j,j,R1(s))
        fprintf('C1%d 2%d 3%d %f\n',j,j,j,C1(s))
        fprintf('C2%d 2%d 4%d %f\n',j,j,j,C2(s))
        fprintf('R2%d 3%d 4%d %f\n',j,j,j,R2(s))
        fprintf('E1%d 4%d 0 5%d 3%d 1meg\n',j,j,j,j)
        fprintf('RB%d 4%d 5%d %f\n',j,j,j,RB(s))
        fprintf('RA%d 5%d 0 %f\n',j,j,RA(s))
        fprintf('R4%d 2%d 0 %f\n',j,j,R4(s))

```

```

        fprintf('RC%d 1%d 5%d %f\n',j,j,j,RC(s))
        if R3(s) == inf
            fprintf('R5%d 3%d 0 %f\n',j,j,j,R5(s))
        elseif R5(s) == inf
            fprintf('R3%d 1%d 3%d %f\n',j,j,j,R3(s))
        end
    else
        fprintf('R1%d 4%d 2%d %f\n',j,j-1,j,R1(s))
        fprintf('C1%d 2%d 3%d %f\n',j,j,j,C1(s))
        fprintf('C2%d 2%d 4%d %f\n',j,j,j,C2(s))
        fprintf('R2%d 3%d 4%d %f\n',j,j,j,R2(s))
        fprintf('E1%d 4%d 0 5%d 3%d 1meg\n',j,j,j,j)
        fprintf('RB%d 4%d 5%d %f\n',j,j,j,RB(s))
        fprintf('RA%d 5%d 0 %f\n',j,j,RA(s))
        fprintf('R4%d 2%d 0 %f\n',j,j,R4(s))
        fprintf('RC%d 4%d 5%d %f\n',j,j-1,j,RC(s))
        if R3(s) == inf
            fprintf('R5%d 3%d 0 %f\n',j,j,j,R5(s))
        elseif R5(s) == inf
            fprintf('R3%d 4%d 3%d %f\n',j,j-1,j,R3(s))
        end
    end
end
end

switch TIPO
    case {'low','high'}
        if mod(N,2)~=0
            j = int8((N/2)-1);
            fprintf('.print AC V(6%d)\n',j)
        else
            j = N/2;
            fprintf('.print AC V(4%d)\n',j)
        end
    case ' '
        j = N;
        fprintf('.print AC V(4%d)\n',j)
end

fprintf('.end')
diary off

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

function pushbutton6_Callback(hObject, eventdata, handles)
global Ws
global handles
global Wc
global N
global Q
global bandera
TIPO = handles.Type;
v = get(handles.TagListboxWn, 'value');

C1 = handles.C1(v);

```

```

C2 = handles.C2(v);
R1 = handles.R1(v);
R2 = handles.R2(v);
R3 = handles.R3(v);
R4 = handles.R4(v);
R5 = handles.R5(v);
RA = handles.RA(v);
RB = handles.RB(v);
RC = handles.RC(v);

a =
((RA*RC)/(RA+RC))*((1/(C1*R2*RC))+1/(C1*R2*RC))+1/(C2*R2*RC))+1/(C2*R2*
*RA))-1/(C1*R5*RB))-1/(C1*R3*RB))-1/(C2*R3*RB))-1/(C2*R5*RB))-
(1/(C2*R4*RB))-1/(C2*R1*RB));
b =
((1/(C1*C2))*((RA*RC)/(RA+RC)))*((1/(R2*R4*RC))+1/(R2*R4*RA))+1/(R1*R2*
RC))+1/(R1*R2*RA))-1/(R3*R4*RB))-1/(R1*R5*RB))-1/(R4*R5*RB))-
(1/(R1*R3*RB)));
c = RA/(RA+RC);
d = 0;
e =
((1/(C1*C2))*((RA*RC)/(RA+RC)))*((1/(R4*R5*RC))+1/(R2*R4*RC))+1/(R1*R5*
RC))+1/(R1*R2*RC))-1/(R3*R4*RB))-1/(R1*R3*RB))-1/(R3*R4*RA))-
(1/(R1*R3*RA)));

num = [c d e];
den = [1 a b];
if mod(N,2)~=0
    if Q(v)<=.5
        global C
        C;
        R = 1/(Wc*C);
        p1 = R;
        p = 1;
        switch TIPO
            case 'low'
                num = [0 1];
                den = [p1 p];
            case 'high'
                num = [1 0];
                den = [p1 p];
        end
    end
end
end

if bandera == 0
    Ws = Wc;
end
transfer(num,den,Ws,TIPO,v,Q,N);
clc

```