

Apéndice F

Lista del programa del Filtro Universal

Apéndice F

Listado del programa: Filtro Universal

```
function UAFpb_OpeningFcn(hObject, eventdata, handles, varargin)

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

n = N;

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

global poles
global Q
global Wn
global Wc

if (bandera ==1|bandera == 3)
    global polos
    P = polos;
else
    P = poles;
end

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 TIPO == ' '
    Q(2:2:(n*2)) = [];
    Wn(2:2:(n*2)) = [];
elseif bandera == 3
    Wn(2:2:(n*2)) = [];
else
    Q(2:2:(n)) = [];
    Wn(2:2:(n)) = [];
    if bandera == 0
        Wn;
    else
        Wn = sort(Wn, 'ascend');
    end
end
end
```

```

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

set(handles.TagListboxWn, 'string', num2str(val))
posval=get(handles.TagListboxWn, 'value');
set(handles.TagEditWn, 'string', num2str(Wn(posval, :)))
set(handles.TagEditQ, 'string', num2str(Q(posval, :)))

%%%%%DATOS DE ENTRADA para el filtro universal inversor
C1 = str2num(get(handles.TagEditC1, 'String'));
global Ho
switch TIPO
    case 'low'
        Ho = (2*(Q(posval))-1)./Q(posval);
    case 'high'
        Ho = (2*(Q(posval))-1)./Q(posval);
    case ' '
        Ho= 2*(Q(posval))-1;
        global Wo
        if bandera == 3 %%eliptico
            Wo
        else
            Wo = sqrt(Wc(1) * Wc(2));
            Wc=Wo;
        end
end
set(handles.TagEditHo, 'string', num2str(Ho));
Ho
if num2str(Ho) == '1'
    %%%Calculos para el filtro universal inversor DE GANANCIA
    UNITARIA
    C2 = C1;
    R4 = 100000;
    R5 = R4;
    R6 = 10000;
    R1 = (50329./Wc)*1000;
    R2 = R1;
    set(handles.TagEditTextTitle, 'string', num2str('Output
Converter'));

else
    C2 = C1;
    C = C2;
    R1 = 1/(Wn(posval))*C;
    R2 = R1;
    R3 = str2num(get(handles.TagEditR3, 'String'));
    R5 = R3;
    R6 = R5;
    R4 = (2*(Q(posval))-1)*R3;
    set(handles.text32, 'enable', 'off');
    set(handles.text34, 'enable', 'off');
    set(handles.text36, 'enable', 'off');
    set(handles.TagEditTextTitle, 'string', num2str('Output'));
end

if num2str(Ho) == '1'
    switch TIPO
        case 'low'

```

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        R3 = inf;
        R7 = (100./(3.7947 * Q(posval)-1)) * 1000;
        R8 = 100000;
        case 'high'
            R3 = inf;
            R7 = (100./(6.6402 * Q(posval)-1)) * 1000;
            R8 = 10000;
        case ' '
            R3 = inf;
            R7 = (100./(3.4785 * Q(posval)-1)) * 1000;
            R8 = 31.62*Q(posval);
    end
    set(handles.TagEditR7, 'string', num2str(R7));
    set(handles.TagEditR8, 'string', num2str(R8));
    set(handles.TagEditR3B, 'string', num2str(R3));
    set(handles.TagEditR3, 'enable', 'off');
    set(handles.text14, 'enable', 'off');

    handles.R7 = R7;
    handles.R8 = R8;
end

%%%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.TagEditR4, 'string', num2str(R4));
set(handles.TagEditR5, 'string', num2str(R5));
set(handles.TagEditR6, 'string', num2str(R6));

handles.C1 = C1;
handles.C2 = C2;
handles.R1 = R1;
handles.R2 = R2;

if Ho == '1'
    R3;
else
    handles.R3 = R3;
end
handles.R4 = R4;
handles.R5 = R5;
handles.R6 = R6;

%%%%%%seleccion del circuito
if num2str(Ho) == '1'
    T = ['FAU2.jpg']
else

    T = ['FAU.jpg']
end

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

```

```

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

% Update handles structure
guidata(hObject, handles);

function listBox1_Callback(hObject, eventdata, handles)
global Q
global Wn
global Wc
global N
global TIPO
global bandera
global Ho
global handles
Ho;

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

%%%DATOS DE ENTRADA para el filtro universal inversor
C1 = str2num(get(handles.TagEditC1, 'String'));

if num2str(Ho) == '1'
    %%%Calculos para el filtro universal inversor DE GANANCIA
    UNITARIA
    C2 = C1;
    R4 = 100000;
    R5 = R4;
    R6 = 10000;
    R1 = (50329./Wc)*1000;
    R2 = R1;
    set(handles.TagEditTextTitle, 'string', num2str('Output
Converter'));
else
    C2 = C1;
    C = C2;
    R1 = 1/(Wn(s))*C;
    R2 = R1;
    R3 = str2num(get(handles.TagEditR3, 'String'));
    R5 = R3;
    R6 = R5;
    R4 = (2*(Q(s))-1)*R3;
    set(handles.text32, 'enable', 'off');
    set(handles.text34, 'enable', 'off');
    set(handles.text36, 'enable', 'off');
    set(handles.TagEditTextTitle, 'string', num2str('Output'));
end

if num2str(Ho) == '1'
    switch TIPO
        case 'low'
            R3 = inf;
            R7 = (100./(3.7947 * Q(s)-1)) * 1000;
            R8 = 100000;
        case 'high'
            R3 = inf;
            R7 = (100./(6.6402 * Q(s)-1)) * 1000;
            R8 = 10000;
    end
end

```

```

        case ' '
            R3 = inf;
            R7 = (100./(3.4785 * Q(s)-1)) * 1000;
            R8 = 31.62*Q(s);
        end
        set(handles.TagEditR7,'string',num2str(R7));
        set(handles.TagEditR8,'string',num2str(R8));
        set(handles.TagEditR3B,'string',num2str(R3));
        set(handles.TagEditR3,'enable','off');
        set(handles.text14,'enable','off');

        handles.R7(s) = R7;
        handles.R8(s) = R8;
    end

    %%%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.TagEditR4,'string',num2str(R4));
    set(handles.TagEditR5,'string',num2str(R5));
    set(handles.TagEditR6,'string',num2str(R6));

    handles.C1(s) = C1;
    handles.C2(s) = C2;
    handles.R1(s) = R1;
    handles.R2(s) = R2;
    if Ho == '1'
        R3;
    else
        handles.R3(s) = R3;
    end
    handles.R4(s) = R4;
    handles.R5(s) = R5;
    handles.R6(s) = R6;

    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.TagEditR3B,'enable','off');
            set(handles.TagEditHo,'enable','off');
            set(handles.TagEditR4,'enable','off');
            set(handles.TagEditR5,'enable','off');
            set(handles.TagEditR6,'enable','off');
            set(handles.TagEditR7,'enable','off');
            set(handles.TagEditR8,'enable','off');
            warningpb(Wc,TIPO);
        else
            set(handles.TagEditC2,'enable','on');
            set(handles.TagEditR1,'enable','on');
            set(handles.TagEditR2,'enable','on');
            set(handles.TagEditR3B,'enable','on');
            set(handles.TagEditHo,'enable','on');
            set(handles.TagEditR4,'enable','on');
            set(handles.TagEditR5,'enable','on');
            set(handles.TagEditR6,'enable','on');
            set(handles.TagEditR7,'enable','on');
        end
    end
end

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        set(handles.TagEditR8,'enable','on');
    end
end
clc

function pushbutton2_Callback(hObject, eventdata, handles)
global bandera
global TIPO
close;
if bandera == 3
    activeEpb(TIPO,2,3,4,5,6);
elseif bandera == 0
    activeTT(TIPO,2,3,4,5,6);
else
    active(1,2,3,4);
end
clear global handles
clc

function pushbutton3_Callback(hObject, eventdata, handles)
global TIPO
global N
global handles
global bandera
global C
global R
global Ho
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')

if num2str(Ho) == '1'
    switch TIPO
        case {'low','high'}
            for j = 1:(N/2)
                R1(s) = handles.R1(j);
                R2(s) = handles.R2(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);
                C1(s) = handles.C1(j);
                C2(s) = handles.C2(j);
                if mod(N,2)~=0
                    if j == 1
                        fprintf('R8%d 1%d 2%d %f\n',j,j,j,R8(s))
                        fprintf('R6%d 2%d 3%d %f\n',j,j,j,R6(s))
                        fprintf('E1%d 3%d 0 8%d 2%d 1meg\n',j,j,j,j)
                        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 2%d 7%d %f\n',j,j,j,R5(s))
                    end
                end
            end
        end
    end
end

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fprintf('R4%d 8%d 5%d %f\n',j,j,j,R4(s))
fprintf('R7%d 8%d 0 %f\n',j,j,R7(s))
switch TIPO
  case 'low'
    fprintf('R%d 7%d 9%d %f\n',j,j,j,R)
    fprintf('C%d 9%d 0 %f\n',j,j,C)
  case 'high'
    fprintf('R%d 9%d 0 %f\n',j,j,R)
    fprintf('C%d 3%d 9%d %f\n',j,j,j,C)
end
else
switch TIPO
  case 'low'
    fprintf('R8%d 7%d 2%d %f\n',j,j-
1,j,R8(s))
    fprintf('R%d 7%d 9%d %f\n',j,j,j,R)
    fprintf('C%d 9%d 0 %f\n',j,j,C)
  case 'high'
    fprintf('R8%d 3%d 2%d %f\n',j,j-
1,j,R8(s))
    fprintf('R%d 9%d 0 %f\n',j,j,R)
    fprintf('C%d 3%d 9%d %f\n',j,j,j,C)
end
fprintf('R6%d 2%d 3%d %f\n',j,j,j,R6(s))
fprintf('E1%d 3%d 0 8%d 2%d lmeg\n',j,j,j,j)
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 lmeg\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 lmeg\n',j,j,j)
fprintf('R5%d 2%d 7%d %f\n',j,j,j,R5(s))
fprintf('R4%d 8%d 5%d %f\n',j,j,j,R4(s))
fprintf('R7%d 8%d 0 %f\n',j,j,R7(s))
end
else
if j == 1
fprintf('R8%d 1%d 2%d %f\n',j,j,j,R8(s))
fprintf('R6%d 2%d 3%d %f\n',j,j,j,R6(s))
fprintf('E1%d 3%d 0 8%d 2%d lmeg\n',j,j,j,j)
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 lmeg\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 lmeg\n',j,j,j)
fprintf('R5%d 2%d 7%d %f\n',j,j,j,R5(s))
fprintf('R4%d 8%d 5%d %f\n',j,j,j,R4(s))
fprintf('R7%d 8%d 0 %f\n',j,j,R7(s))
else
switch TIPO
  case 'low'
    fprintf('R8%d 7%d 2%d %f\n',j,j-
1,j,R8(s))
  case 'high'
    fprintf('R8%d 3%d 2%d %f\n',j,j-
1,j,R8(s))
end
fprintf('R6%d 2%d 3%d %f\n',j,j,j,R6(s))
fprintf('E1%d 3%d 0 8%d 2%d lmeg\n',j,j,j,j)
fprintf('R1%d 3%d 4%d %f\n',j,j,j,R1(s))

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```

        fprintf('C1%d 4%d 5%d %f\n',j,j,j,C1(s))
        fprintf('E2%d 5%d 0 0 4%d lmeg\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 lmeg\n',j,j,j)
        fprintf('R5%d 2%d 7%d %f\n',j,j,j,R5(s))
        fprintf('R4%d 8%d 5%d %f\n',j,j,j,R4(s))
        fprintf('R7%d 8%d 0 %f\n',j,j,R7(s))
    end
end
end
case ''
    for j = 1:N
        R1(s) = handles.R1(j);
        R2(s) = handles.R2(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);

        if j == 1
            fprintf('R8%d 1%d 2%d %f\n',j,j,j,R8(s))
            fprintf('R6%d 2%d 3%d %f\n',j,j,j,R6(s))
            fprintf('E1%d 3%d 0 8%d 2%d lmeg\n',j,j,j,j)
            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 lmeg\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 lmeg\n',j,j,j)
            fprintf('R5%d 2%d 7%d %f\n',j,j,j,R5(s))
            fprintf('R4%d 8%d 5%d %f\n',j,j,j,R4(s))
            fprintf('R7%d 8%d 0 %f\n',j,j,R7(s))
        else
            fprintf('R8%d 5%d 2%d %f\n',j,j-1,j,R8(s))
            fprintf('R6%d 2%d 3%d %f\n',j,j,j,R6(s))
            fprintf('E1%d 3%d 0 8%d 2%d lmeg\n',j,j,j,j)
            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 lmeg\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 lmeg\n',j,j,j)
            fprintf('R5%d 2%d 7%d %f\n',j,j,j,R5(s))
            fprintf('R4%d 8%d 5%d %f\n',j,j,j,R4(s))
            fprintf('R7%d 8%d 0 %f\n',j,j,R7(s))
        end
    end
end
else
    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);
            end
        end
    end
end

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

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```

        fprintf('R6%d 4%d 3%d %f\n',j,j,j,R6(s))
        fprintf('R5%d 4%d 8%d %f\n',j,j,j,R5(s))
        fprintf('R4%d 2%d 5%d %f\n',j,j,j,R4(s))
        fprintf('C1%d 5%d 6%d %f\n',j,j,j,C1(s))
        fprintf('R1%d 3%d 6%d %f\n',j,j,j,R1(s))
        fprintf('E2%d 5%d 0 0 6%d lmeg\n',j,j,j)
        fprintf('R2%d 5%d 7%d %f\n',j,j,j,R2(s))
        fprintf('C2%d 7%d 8%d %f\n',j,j,j,C2(s))
        fprintf('E3%d 8%d 0 0 7%d lmeg\n',j,j,j)
    else
        fprintf('R3%d 5%d 2%d %f\n',j,j-1,j,R3(s))
        fprintf('E1%d 3%d 0 2%d 4%d lmeg\n',j,j,j,j)
        fprintf('R6%d 4%d 3%d %f\n',j,j,j,R6(s))
        fprintf('R5%d 4%d 8%d %f\n',j,j,j,R5(s))
        fprintf('R4%d 2%d 5%d %f\n',j,j,j,R4(s))
        fprintf('C1%d 5%d 6%d %f\n',j,j,j,C1(s))
        fprintf('R1%d 3%d 6%d %f\n',j,j,j,R1(s))
        fprintf('E2%d 5%d 0 0 6%d lmeg\n',j,j,j)
        fprintf('R2%d 5%d 7%d %f\n',j,j,j,R2(s))
        fprintf('C2%d 7%d 8%d %f\n',j,j,j,C2(s))
        fprintf('E3%d 8%d 0 0 7%d lmeg\n',j,j,j)
    end
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(8%d)\n',j)
            case 'high'
                fprintf('.print AC V(3%d)\n',j)
        end
    end
end
end

fprintf('.end')
diary off

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

function pushbutton4_Callback(hObject, eventdata, handles)
global Ws
global TIPO
global handles
global Wc
global N
global Q
global Ho
Ho;
v = get(handles.TagListboxWn, 'value');

```

```

if num2str(Ho) == '1'
    R1 = handles.R1(v);
    R2 = handles.R2(v);
    R3 = inf;
    R4 = handles.R4(v);
    R5 = handles.R5(v);
    R6 = handles.R6(v);
    R7 = handles.R7(v);
    R8 = handles.R8(v);
    C1 = handles.C1(v);
    C2 = handles.C2(v);

    switch TIPO
        case 'low'
            if mod(N,2)~=0
                z = -(R6/R8)*(1/(R1*R2*C1*C2));
                p1 =
(1+(R6/R5)+(R6/R8))*((1/(1+(R4/R3)+(R4/R7)))*(1/(R1*C1)));
                p = (1+(R6/R5))*(1/(R1*C1*R2*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 = -(R6/R8)*(1/(R1*R2*C1*C2));
                p1 =
(1+(R6/R5)+(R6/R8))*((1/(1+(R4/R3)+(R4/R7)))*(1/(R1*C1)));
                p = (1+(R6/R5))*(1/(R1*C1*R2*C2));

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

            z = -(R6/R8);
            p1 =
(1+(R6/R5)+(R6/R8))*((1/(1+(R4/R3)+(R4/R7)))*(1/(R1*C1)));
            p = (1+(R6/R5))*(1/(R1*C1*R2*C2));
            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;
                    p = 1;

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

```

```

        end
    end
    case ' '
        z = (R6/R8)*(1/(R1*C1*R2*C2));
        p1 =
(1+(R6/R5)+(R6/R8))*((1/(1+(R4/R3)+(R4/R7)))*(1/(R1*C1)));
        p = (1+(R6/R5))*(1/(R1*C1*R2*C2));

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

                num = [0 z];
                den = [1 p1 p];
            end
        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)*(1/(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)*(1/(R1*R2*C1*C2));

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

    num = [z 0];
    den = [1 p1 p];
end
end
transfer(num,den,Ws,TIPO,v,Q,N);

```