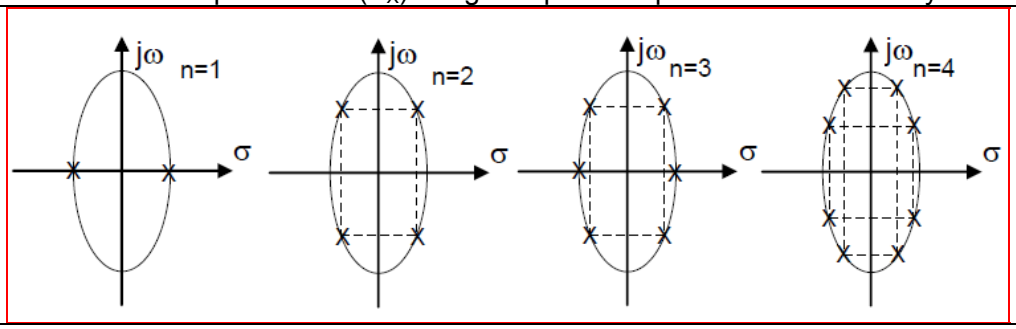
Formulario para evaluación escrita de la asignatura Circuitos Eléctricos 3 (Hoja 1)

Ecuaciones asociadas a las aproximaciones de Butterworth y Chebyshev					
$\lvert H(jw)\rvert_{dB} = 20\bullet\log\left(\lvert H(jw)\rvert\right)$	$\lvert H(jw)\rvert = \left(1+B_n\bullet w^{2n}\right)^{-1/2}$	$\lvert H(jw)\rvert = \left(1+\varepsilon^2\bullet C_n^2(w)\right)^{-1/2}$			
$\lvert H(jw_X)\rvert_{dB} = -20n\bullet\log(w_X) - 10\log(B_n)$			$w_x = w/w_c$	$w_x = w_c/w$	$w_{x3} = 1/\sqrt[2n]{B_n}$
$S_X = S/W_3$	$S_X = S/W_C$	$S_X = W_3/S$	$S_X = W_C/S$	$H(S_X) = 1/B(S_X)$	

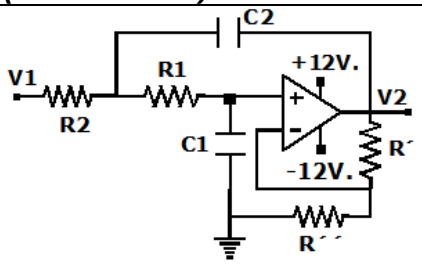
Polinomios de Butterworth		Polinomios de Chebyshev
n	B(S_X)	$C_n(w)=\cos(n*\cos^{-1}(w))$ para w≤1
1	(S_X+1)	$C_n(w)=\cosh(n*\cosh^{-1}(w))$ para w>1
2	(S_x^2+1.414 S_X+1)	a = (1/N)*senh^{-1}(1/Ɛ)
3	(S_x^2+ S_X+1) (S_X+1)	σ_{Xk}=senh(a)*sen(((2k+1)*Pi)/2N)
4	(S_x^2+ 0.756S_X+1) (S_x^2+ 1,848S_X+1)	w_{Xk}=cosh(a)*cos(((2k+1)*Pi)/2N)
5	(S_x^2+ 0.618S_X+1) (S_x^2+ 1,618S_X+1) (S_X+1)	$K_C=1/(Ɛ*2^{(N-1)})$
6	(S_x^2+ 0.518S_X+1) (S_x^2+ 1,414S_X+1) (S_x^2+ 1,932S_X+1)	
7	(S_x^2+ 0.445S_X+1) (S_x^2+ 1,247S_X+1) (S_x^2+ 1,802S_X+1) (S_X+1)	
8	(S_x^2+ 0.39S_X+1) (S_x^2+ 1,111S_X+1) (S_x^2+ 1,166S_X+1) (S_x^2+ 1,962S_X+1)	
9	(S_x^2+ 0.343S_X+1) (S_x^2+ S_X+1) (S_x^2+ 1,523S_X+1) (S_x^2+ 1,879S_X+1) (S_X+1)	
10	(S_x^2+ 0.313S_X+1) (S_x^2+ 0,908S_X+1) (S_x^2+ 1,414S_X+1) (S_x^2+ 1,782S_X+1) (S_x^2+ 1,975S_X+1)	

Distribución de polos de $|H(S_X)|^2$ según n para la aproximación de Chebyshev



Configuraciones para el diseño de filtros activos (Primera Parte)

$$H_{V21}(S) = \frac{Av/R_1C_1R_2C_2}{S^2 + \frac{R_1C_1 + R_2C_1 + R_2C_2(1-Av)}{R_1C_1R_2C_2}S + \frac{1}{R_1C_1R_2C_2}}$$

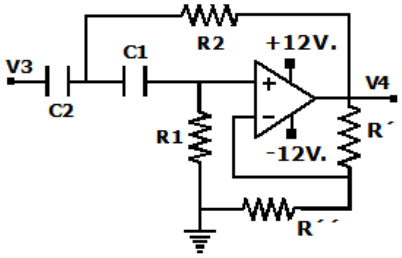


$d1 = \frac{3-Av}{RC}$	$d0 = \frac{1}{(RC)^2}$	$Av = 1 + R'/R''$	$Av = 3 - \frac{d1}{\sqrt{d0}}$	
$\sqrt{d0} = \frac{1}{RC}$	$R = \frac{1}{C\sqrt{d0}}$	$\gamma = \frac{C_1}{C_2}$	$T_1\bullet T_2 = 1$	$T_1 = R_1\bullet C_1\bullet\sqrt{d0}$
$\gamma < \frac{\frac{d1^2}{d0} - 4(1-Av)}{4}$	$T_1 = \frac{d1}{2\bullet\sqrt{d0}}\left[1+\sqrt{1-\frac{4(1+\gamma-Av)d0}{d1^2}}\right]$			$T_2 = R_2\bullet C_2\bullet\sqrt{d0}$

Formulario para evaluación escrita de la asignatura Circuitos Eléctricos 3 (Hoja 2)

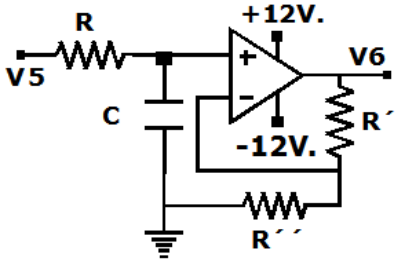
Configuraciones para el diseño de filtros activos (Segunda Parte)

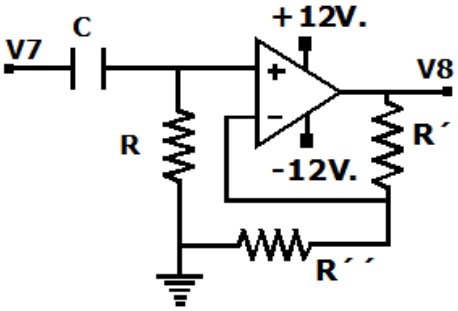
$$H_{V43}(S)=\frac{Av\bullet S^2}{S^2+\frac{R_2C_2+R_2C_1+R_2C_2(1-Av)}{R_1C_1R_2C_2}S+\frac{1}{R_1C_1R_2C_2}}$$



$d1=\frac{3-Av}{RC}$	$d0=\frac{1}{(RC)^2}$	$Av=1+R'/R''$	$Av=3-\frac{d1}{\sqrt{d0}}$	
$\sqrt{d0}=\frac{1}{RC}$	$R=\frac{1}{C\sqrt{d0}}$	$\gamma=\frac{C_1}{C_2}$	$T_1=R_1\bullet C_1\bullet\sqrt{d0}$	$T_2=R_2\bullet C_2\bullet\sqrt{d0}$
$\gamma>\frac{\frac{d1^2}{d0}-4(1-Av)}{4(1-Av)}$	$T_2=\frac{d1}{2\bullet(1+\gamma)\bullet\sqrt{d0}}\left[1+\sqrt{1-\frac{4(1+\gamma)(1-Av)d0}{d1^2}}\right]$			$T_1\bullet T_2=1$

Configuraciones para el diseño de filtros activos (Tercera Parte)





$$H_{V65}(S)=\frac{Av/RC}{S+\frac{1}{RC}}\quad\text{con}\quad Av=1+R'/R''$$

$$H_{V87}(S)=\frac{Av\bullet S}{S+\frac{1}{RC}}\quad\text{con}\quad Av=1+R'/R''$$

Standard 5 Percent Tolerance Resistor Values

1.0	1.1	1.2	1.3	1.5	1.6	1.8	2.0	2.2	2.4	2.7	3.0	3.3	3.6	3.9	4.3	4.7	5.1	5.6	6.2	6.8	7.5	8.2	9.1	Ω
10.	11.	12.	13.	15.	16.	18.	20.	22.	24.	27.	30.	33.	36.	39.	43.	47.	51.	56.	62.	68.	75.	82.	91.	Ω
100	110	120	130	150	160	180	200	220	240	270	300	330	360	390	430	470	510	560	620	680	750	820	910	Ω
1.0	1.1	1.2	1.3	1.5	1.6	1.8	2.0	2.2	2.4	2.7	3.0	3.3	3.6	3.9	4.3	4.7	5.1	5.6	6.2	6.8	7.5	8.2	9.1	kΩ
10.	11.	12.	13.	15.	16.	18.	20.	22.	24.	27.	30.	33.	36.	39.	43.	47.	51.	56.	62.	68.	75.	82.	91.	kΩ
100	110	120	130	150	160	180	200	220	240	270	300	330	360	390	430	470	510	560	620	680	750	820	910	kΩ
1.0	1.1	1.2	1.3	1.5	1.6	1.8	2.0	2.2	2.4	2.7	3.0	3.3	3.6	3.9	4.3	4.7	5.1	5.6	6.2	6.8	7.5	8.2	9.1	MΩ