

Formelsamling

SSY011 Elektriska system

v. 1.04, 27 augusti 2017

Detta blad bifogas tentamina i SSY011 Elektriska system.

Decibel, definition

$$\text{dB} = 10 \log_{10} \frac{P_1}{P_0}$$

Decibel, speciella referensnivåer

$$\text{dBW} = 10 \log_{10} \frac{P}{1 \text{ W}}$$

$$\text{dBm} = 10 \log_{10} \frac{P}{1 \text{ mW}}$$

$$\text{dBV} = 20 \log_{10} \frac{U_{\text{eff}}}{1 \text{ V}}$$

$$\text{dB SPL} = 20 \log_{10} \frac{p}{20 \mu\text{Pa}}$$

$$(94 \text{ dB SPL} \leftrightarrow 1 \text{ Pa})$$

FET, n-kanal

$$I_D = \begin{cases} 0 & \text{if } U_{GS} \leq U_T \\ \beta(U_{GS} - U_T)^2 & \text{if } 0 \leq U_{GS} - U_T \leq U_{DS} \end{cases}$$

FET, p-kanal

$$I_D = \begin{cases} 0 & \text{if } -U_{GS} \leq -U_T \\ -\beta(-U_{GS} + U_T)^2 & \text{if } 0 \leq U_{GS} - U_T \leq U_{DS} \end{cases}$$

Butterworth-filter

Ordning	Polynom $P(a)$
1	$1 + a$
2	$1 + 1.414a + a^2$
3	$1 + 2a + 2a^2 + a^3$ $= (1 + a)(1 + a + a^2)$
4	$1 + 2.613a + 3.414a^2 + 2.613a^3 + a^4$ $= (1 + 0.765a + a^2)(1 + 1.848a + a^2)$

Chebyshev-filter typ 1 med 3 dB rippel

Ordning	Polynom $P(a)$
2	$1.414 + 1.287a + 2a^2$ $= 1.414(1 + 0.910a + 1.414a^2)$
3	$1 + 3.711a + 2.384a^2 + 4a^3$ $= (1 + 3.355a)(1 + 0.355a + 1.192a^2)$
4	$1.414 + 3.231a + 9.348a^2 + 4.644a^3 + 8a^4$ $= 1.414(1 + 0.188a + 1.108a^2)(1 + 2.096a + 5.108a^2)$

Kaskadkopplade 1:a ordningens förstärkarsteg

$$A = A_1^N$$

$$f_{\text{ö}} = f_{\text{ö1}} \sqrt{2^{1/N} - 1}$$

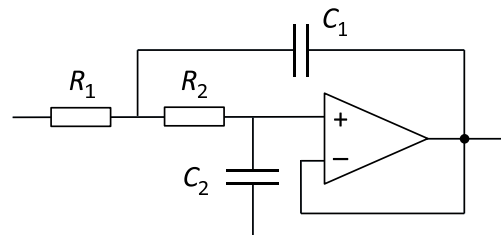
Filterkonstruktion, tabellmetoden

$$\text{LP: } H(s) = \frac{1}{P(s/\omega_{\text{ö}})}$$

$$\text{HP: } H(s) = \frac{1}{P(\omega_{\text{u}}/s)}$$

Sallen-Key-filter

$$H(s) = \frac{1}{1 + s(R_1 + R_2)C_2 + s^2 R_1 R_2 C_1 C_2}$$



Komponentvärden

E12	E6
10	10
12	
15	15
18	
22	22
27	
33	33
39	
47	47
56	
68	68
82	