{DV hiver 2019 n°2} Applications numériques & Mathématiques

CORRECTION ECLAIR

S2, APP1 DUT GE1 — 4 mars 2019 — S.POUJOULY — poujouly.net

Exercice n°1 : Applications numériques spéciales formules électroniques ★☆☆

Equations	Valeurs	Equations	Valeurs
$fc=\frac{1}{2\pi.R.C}$	a) R=10kΩ C=680pF **fc=23,4kHz** b) R=1MΩ C=2,2µF **fc=72,3mHz**	$\omega o=\frac{1}{\sqrt{R1.R2.C1.C2}}$	a) R2=75kΩ R1=330kΩ C1=2,2µF C2=2,2µF **ωo=2,89rad/s** b) R2=1,8kΩ R1=6,8kΩ C1=470pF C2=470pF **ωo=608krad/s**
$fo=\frac{1}{2\pi\sqrt{LC}}$	a) L=47nH C=22pF **fo=156,5MHz** b) L=2,2mH C=15nF **fo=27,7kHz**	$G_{dB}=20.\log\left(\frac{1}{\sqrt{1+\left(\frac{f}{fc}\right)^2}}\right)$	a) f=10kHz fc=200Hz **G_{dB}=0dB** b) f=50kHz fc=50Hz **G_{dB}=-60dB**
$Req=\frac{R2\cdot R1}{R2+R1}$	a) R2=68kΩ R1=33kΩ **Req= 22,2kΩ** b) R2=1,2MΩ R1=680kΩ **Req=434kΩ**	$fc1=\frac{R1+R2}{2\pi R1.R2.C}$	a) R2=33kΩ R1=220kΩ C=470nF **fc1=11,8Hz** b) R2=27kΩ R1=56kΩ C=1,2nF **fc1=7,28kHz**
$U_{dBV}=20.\log\left(\frac{U}{\sqrt{2}}\right)$	a) U=2mV **U_{dBV}=-57dBV** b) U=2V **U_{dBV}=3dBV**	$U=\frac{R1.Vdd}{R1+R2}$	a) R2=33kΩ R1=220kΩ Vdd=3V **U=2,61V** b) R1=10kΩ R1=180kΩ Vdd=5V **U=263,2mV**

Exercice n°2 : Manipulations autour de relations classiques en électronique ★☆☆

Equation initiale	Expression recherchée	Equation initiale	Expression recherchée
$fc=\frac{1}{2\pi.R.C}$	$R=\frac{1}{2\pi.fc.C}$	$U_{dBV}=20.\log\left(\frac{U}{\sqrt{2}}\right)$	$U=\sqrt{2}.10^{\frac{U_{dBV}}{20}}$
$fo=\frac{1}{2\pi\sqrt{LC}}$	$C=\frac{1}{L\cdot(2\pi fo)^2}$	$G_{dB}=20.\log\left(1+\left(\frac{R2}{R1}\right)\right)$	$R1=\frac{R2}{10^{\frac{G_{dB}}{20}}-1}$
$Req=\frac{R2\cdot R1}{R2+R1}$	$R2=\frac{Req\cdot R1}{R1-Req}$	$fo=\frac{1}{2\pi\sqrt{R1.R2.C1.C2}}$	$C1=\frac{1}{R1.R2.C2\cdot(2\pi fo)^2}$
$fc1=\frac{R1+R2}{2\pi R1.R2.C}$	$R1=\frac{R2}{2\pi fc1.R2.C-1}$	$G_{dB}=20.\log\left(\frac{1}{\sqrt{1+\left(\frac{f}{fc}\right)^2}}\right)$	$f=fc.\sqrt{10^{\frac{G_{dB}}{-10}}-1}$
$U=\frac{R1.Vdd}{R1+R2}$	$R1=\frac{R2.U}{vdd-U}$	$Arg(T)=\frac{\pi}{2}-\arctan(RC\omega$	$C=\frac{\tan\left(\frac{\pi}{2}-Arg(T)\right)}{R\omega}$