

rechnung_betragundphase_umkehrintegrator

Student Group

First Name	Surname	Matrikel Nr.

Table of Contents

$U_A = -\frac{1}{R} \int_{t_0}^{t_1} \frac{dU_E(t)}{dt} + U_{A0}$	insert sine function	$U_E(t) = \hat{U}_E \sin(\omega t)$	
$U_A = -\frac{1}{R} \int_{t_0}^{t_1} \hat{U}_E \sin(\omega t) dt + U_{A0}$	insert root function with limits	$\int_{x_0}^{x_1} \sin(ax) dx = -\frac{1}{a} \cos(ax) \Big _{x_0}^{x_1}$	
$U_A = -\frac{1}{R} \int_{t_0}^{t_1} \hat{U}_E \cos(\omega t) dt + U_{A0}$	put constant before integral		
$U_A = \frac{1}{\omega R} \left[\cos(\omega t) \Big _{t_0}^{t_1} + U_{A0} \right]$	insert limits	$t_0=0, t_1=t$	
$U_A = \frac{\hat{U}_E}{\omega R} \left[\cos(\omega t) - \cos(\omega t_0) \right] + U_{A0}$		$\cos(0) = 1$	
$U_A = \frac{\hat{U}_E}{\omega R} \left[\cos(\omega t) - 1 \right] + U_{A0}$	multiply		
$U_A = \frac{\hat{U}_E}{\omega R} \left[\cos(\omega t) - 1 \right] + U_{A0}$	consider the non-cosine terms		
$U_A = \frac{\hat{U}_E}{\omega R} \left[\cos(\omega t) - 1 \right] + U_{A0}$	This part is independent in time. Since we assume purely sinusoidal quantities, the for the initial voltage of the capacitor must be: $U_{A0} = U_{A0}$		
$U_A = \frac{\hat{U}_E}{\omega R} \left[\cos(\omega t) - 1 \right] + U_{A0}$			

From: <https://mexle.te.hs-heilbronn.de/> - MEXLE Wiki

Permanent link: https://mexle.te.hs-heilbronn.de/circuit_design/rechnung_betragundphase_umkehrintegrator?rev=1632676812

Last update: 2021/09/26 19:20

