

rechnung_betragundphase_umkehrintegrator

Student Group

First Name	Surname	Matrikel Nr.

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$\$U_A = -\{1 \over \color{blue}\{R\}\color{black}\dot C\} \}\color{black}\int_{t_0}^{t_1} \color{blue}\{U_E(t)\} \, dt + U_{A0}\$$	Sinusfunktion einsetzen	$\$ \color{blue}\{U_E(t)\} = \hat{u}_E \color{black}\sin(\omega \color{black}\dot C t)\$$
$\$ \color{black}\int_{t_0}^{t_1} \color{blue}\{U_E(t)\} \, dt + U_{A0}\$$		$\$ \color{black}\int_{t_0}^{t_1} \color{blue}\{U_E(t)\} \, dt + U_{A0}\$$
$\$U_A = -\{1 \over \color{black}\{R\}\color{black}\dot C\} \}\color{black}\int_{t_0}^{t_1} \color{blue}\{U_E \color{black}\sin(\omega \color{black}\dot C t)\} \, dt + U_{A0}\$$	Stammfunktion mit Grenzen einsetzen	$\$ \color{blue}\{\int_{x_0}^{x_1} \sin(a \color{black}\dot C x) \, dx\} = [-\{1 \over a\} \color{black}\cos(a \color{black}\dot C x)]_{x_0}^{x_1}\$$
$\$ \color{black}\int_{t_0}^{t_1} \color{blue}\{U_E \color{black}\sin(\omega \color{black}\dot C t)\} \, dt + U_{A0}\$$	Konstante vor Integral setzen	
$\$U_A = -\{1 \over \color{black}\{R\}\color{black}\dot C\} \}\color{black}\int_{t_0}^{t_1} \color{blue}\{U_E \color{black}\sin(\omega \color{black}\dot C t)\} \, dt + U_{A0}\$$		
$\$U_A = \{1 \over \color{black}\{R\}\color{black}\dot C\} \}\color{black}\int_{t_0}^{t_1} \color{blue}\{U_E \color{black}\cos(\omega \color{black}\dot C t)\} \, dt + U_{A0}\$$	Grenzwerte einsetzen	$\$t_0=0\$, \, t_1=t\$$
$\$ \color{black}\int_{t_0}^{t_1} \color{blue}\{U_E \color{black}\cos(\omega \color{black}\dot C t)\} \, dt + U_{A0}\$$		
$\$U_A = \{ \color{black}\{U_E\} \over \color{black}\{\omega \color{black}\dot C R\color{black}\dot C\} \} \color{black}\int_{t_0}^{t_1} \color{blue}\{\cos(\omega \color{black}\dot C t) - \color{blue}\{\cos(0)\}\} \, dt + U_{A0}\$$		$\$ \color{blue}\{\cos(0)\}=1\$$
$\$ \color{black}\int_{t_0}^{t_1} \color{blue}\{\cos(\omega \color{black}\dot C t) - \color{blue}\{\cos(0)\}\} \, dt + U_{A0}\$$	Ausmultiplizieren	
$\$ \color{black}\int_{t_0}^{t_1} \color{blue}\{\cos(\omega \color{black}\dot C t) - \color{blue}\{\cos(0)\}\} \, dt + U_{A0}\$$		
$\$U_A = \{ \color{black}\{U_E\} \over \color{black}\{\omega \color{black}\dot C R\color{black}\dot C\} \} \color{black}\int_{t_0}^{t_1} \color{blue}\{\cos(\omega \color{black}\dot C t) - \color{blue}\{\cos(0)\}\} \, dt + U_{A0}\$$	Betrachtung der nicht-Kosinus-Terme	
$\$ \color{black}\int_{t_0}^{t_1} \color{blue}\{\cos(\omega \color{black}\dot C t) - \color{blue}\{\cos(0)\}\} \, dt + U_{A0}\$$		
$\$U_A = \{ \color{black}\{U_E\} \over \color{black}\{\omega \color{black}\dot C R\color{black}\dot C\} \} \color{black}\int_{t_0}^{t_1} \color{blue}\{\cos(\omega \color{black}\dot C t) - \color{blue}\{\cos(0)\}\} \, dt + U_{A0}\$$		Dieser Teil ist zeitlich unabhängig. Da wir von rein sinusförmigen Größen ausgehen, muss die für die anfängliche Spannung des Kondensators gelten: $U_{C0} = U_{A0} = \{ \color{black}\{U_E\} \over \color{black}\{\omega \color{black}\dot C R\color{black}\dot C\} \}$
$\$ \color{black}\int_{t_0}^{t_1} \color{blue}\{\cos(\omega \color{black}\dot C t) - \color{blue}\{\cos(0)\}\} \, dt + U_{A0}\$$		
$\$U_A = \{ \color{black}\{U_E\} \over \color{black}\{\omega \color{black}\dot C R\color{black}\dot C\} \} \color{black}\int_{t_0}^{t_1} \color{blue}\{\cos(\omega \color{black}\dot C t) - \color{blue}\{\cos(0)\}\} \, dt + U_{A0}\$$		
$\$ \color{black}\int_{t_0}^{t_1} \color{blue}\{\cos(\omega \color{black}\dot C t) - \color{blue}\{\cos(0)\}\} \, dt + U_{A0}\$$		

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