rechnung_nichtinvertierender_verstaerker

Student Group

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$I.\quad$ Analysis of the Currents

by (2)+(3)	$\color{blue}{I_p} = \color{blue}{I_m} = 0$
	therefore, I_p and I_m are defined
$\quad\quad\quad$	$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$
by (6)	$\color{blue}{I_o} = I_1 $
	I_o is defined, when I_1 is defined
$\quad\quad\quad$	$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$
by (7)+(3)	$I_1 - I_2 -\color{blue}{0} = 0 $
	$\quad$
$\quad\quad\quad$	$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$
$\quad$	$I_1 = I_2 = I_o$
	$\quad$
$\quad\quad\quad$	$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$
$\quad$	$\color{blue}{I_1} = \color{blue}{I_2} = \color{blue}{I_o} $
	with (8) and (9): $I_\boxed{}=\frac{U_\boxed{}}{R_\boxed{}}$ and (5)
$\quad\quad\quad$	$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$
$\quad$	$\frac{U_1}{R_1}= \frac{U_2}{R_2} = \frac{U_A}{R_1 + R_2}$
	Voltage divider, $I=const.$
$\quad\quad\quad$	$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$
(10)	$U_2= U_A\cdot\frac{R_2}{R_1+R_2}$
	Voltage divider
$\quad\quad\quad$	$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$

$II.\quad$ Analysis if the Voltage Amplification

by (0)	$\color{blue}{A_V}=\frac{U_O}{U_I}$
	$\quad$
$\quad\quad\quad$	$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$
$\quad$	$A_V=\frac{U_O}{\color{blue}{U_I}}$
	with (4): $U_I=U_2+U_D$
$\quad\quad\quad$	$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$
$\quad$	$A_V=\frac{U_O}{\color{blue}{U_2+U_D}}$
	$\quad$
$\quad\quad\quad$	$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$
$\quad$	$A_V=\frac{U_O}{\color{blue}{U_2}+U_D}$
	with (10): $U_2= U_O\cdot\frac{R_2}{R_1+R_2}$
$\quad\quad\quad$	$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$
$\quad$	$A_V=\frac{U_O}{\color{blue}{U_A\cdot\frac{R_2}{R_1+R_2}}+U_D}$
	$\quad$
$\quad\quad\quad$	$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$

$\quad$	$A_V=\frac{U_O}{U_O\cdot\frac{R_2}{R_1+R_2}+U_D}$	
	$\quad$	
$\quad\quad\quad\quad\quad\quad\quad$	$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$	$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$

$\quad$	$A_V=\frac{U_O}{U_O\cdot\frac{R_2}{R_1+R_2}+\color{blue}{U_D}}$
	with (1)
$\quad\quad\quad$	$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$

$\quad$	$A_V=\frac{U_O}{U_O\cdot\frac{R_2}{R_1+R_2}+\color{blue}{\frac{U_O}{A_D}}}$

	$\quad$
$\quad\quad\quad$	$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$
$\quad$	$A_V=\frac{U_O}{U_O\cdot\frac{R_2}{R_1+R_2}+\frac{U_O}{A_D}}$
	$\quad$
$\quad\quad\quad$	$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$
$\quad$	$A_V=\frac{\color{blue}{U_O}}{\color{blue}{U_O}\cdot\frac{R_2}{R_1+R_2}+\frac{\color{blue}{U_O}}{A_D}}$
	Expand with $\frac{1}{U_O}$
$\quad\quad\quad$	$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$
$\quad$	$A_V=\frac{1}{\frac{R_2}{R_1+R_2}+\frac{1}{A_D}}$
	$\quad$
$\quad\quad\quad$	$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$
$\quad$	$A_V=\frac{1}{\frac{R_2}{R_1+R_2}+\color{blue}{\frac{1}{A_D}}}$
	with $\frac{1}{A_D} \xrightarrow{A_D \rightarrow \infty} 0$
$\quad\quad\quad$	$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$
$\quad$	$A_V=\frac{1}{\frac{R_2}{R_1+R_2}}$
	reshaping the fraction
$\quad\quad\quad$	$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$
$\quad$	$A_V=\frac{R_1+R_2}{R_2}$
	$\quad$
$\quad\quad\quad$	$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$