

rechnung_nichtinvertierender_verstaerker

Student Group

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Table of Contents

I. Analysis of the Currents

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

II. Analysis of the Voltage Amplification

by (0)	$A_V = \frac{U_O}{U_I}$
	$A_V = \frac{U_O}{U_I}$
	with (4): $U_I = U_2 + U_D$
	$A_V = \frac{U_O}{U_2 + U_D}$
	$A_V = \frac{U_O}{U_2 + U_D}$
	with (10): $U_2 = U_O \cdot \frac{R_2}{R_1 + R_2}$
	$A_V = \frac{U_O}{U_O \cdot \frac{R_2}{R_1 + R_2} + U_D}$
	$A_V = \frac{U_O}{U_O \cdot \frac{R_2}{R_1 + R_2} + U_D}$
	$A_V = \frac{U_O}{U_O \cdot \frac{R_2}{R_1 + R_2} + U_D}$
	with (1)

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$\$ \backslash \text{quad} \$$	$\$ A_{\text{V}} = \frac{U_{\text{O}}}{U_{\text{O}}} \cdot \frac{R_2}{R_1 + R_2} + \text{color}\{\text{blue}\} \left\{ \frac{U_{\text{O}}}{U_{\text{O}}} \cdot A_{\text{D}} \right\} \$$
	$\$ \backslash \text{quad} \$$
$\$ \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \$$	$\$ \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \$$
$\$ \backslash \text{quad} \$$	$\$ A_{\text{V}} = \frac{U_{\text{O}}}{U_{\text{O}}} \cdot \frac{R_2}{R_1 + R_2} + \frac{U_{\text{O}}}{U_{\text{O}}} \cdot A_{\text{D}} \$$
	$\$ \backslash \text{quad} \$$
$\$ \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \$$	$\$ \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \$$
$\$ \backslash \text{quad} \$$	$\$ A_{\text{V}} = \frac{\text{color}\{\text{blue}\} U_{\text{O}}}{U_{\text{O}}} \cdot \frac{R_2}{R_1 + R_2} + \frac{\text{color}\{\text{blue}\} U_{\text{O}}}{U_{\text{O}}} \cdot A_{\text{D}} \$$
	Expand with $\$ \frac{1}{U_{\text{O}}} \$$
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$\$ \backslash \text{quad} \$$	$\$ A_{\text{V}} = \frac{1}{\frac{R_2}{R_1 + R_2} + \frac{1}{A_{\text{D}}}} \$$
	$\$ \backslash \text{quad} \$$
$\$ \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \$$	$\$ \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \$$
$\$ \backslash \text{quad} \$$	$\$ A_{\text{V}} = \frac{1}{\frac{R_2}{R_1 + R_2} + \text{color}\{\text{blue}\} \frac{1}{A_{\text{D}}}} \$$
	with $\$ \frac{1}{A_{\text{D}}} \rightarrow A_{\text{D}} \rightarrow \infty \$$
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$\$ \backslash \text{quad} \$$	$\$ A_{\text{V}} = \frac{1}{\frac{R_2}{R_1 + R_2}} \$$
	reshaping the fraction
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$\$ \backslash \text{quad} \$$	$\$ A_{\text{V}} = \frac{R_1 + R_2}{R_2} \$$
	$\$ \backslash \text{quad} \$$
$\$ \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \$$	$\$ \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \backslash \text{quad} \$$

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Last update: **2023/03/28 09:51**

