

# 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)	$I_1 - I_2 - 0 = 0$
	$I_1 = I_2 = I_o$
	$I_1 = I_2 = I_o$
	with (8) and (9): $I_{\boxed{}} = \frac{U_{\boxed{}}}{R_{\boxed{}}}$ and (5)
	$\frac{U_1}{R_1} = \frac{U_2}{R_2} = \frac{U_A}{R_1 + R_2}$
	Voltage divider, $I = \text{const.}$
(10)	$U_2 = U_A \cdot \frac{R_2}{R_1 + R_2}$
	Voltage divider

II. Analysis if 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): $U_2 = U_o \cdot \frac{R_2}{R_1 + R_2}$
	$A_V = \frac{U_o}{U_o \cdot \frac{R_2}{R_1 + R_2} + U_D}$
	$A_V = \frac{U_o}{U_o \cdot \frac{R_2}{R_1 + R_2} + U_D}$
	with (1)
	$A_V = \frac{U_o}{U_o \cdot \frac{R_2}{R_1 + R_2} + \frac{U_o}{A_D}}$

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

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