

calc_decimal_example

Student Group

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Table of Contents

$\$1.\!\!\!\!\!\quad$ Calculation example for decimal value

value		2	6	5	8	,	4	7
index	i	3	2	1	0		-1	-2
place value	B^i	10^3 \$1000\$	10^2 \$100\$	10^1 \$10\$	10^0 \$1\$		10^{-1} \$0.1\$	10^{-2} \$0.01\$
digit	z_i	2	6	5	8		4	7
calculation	$z_i \cdot B^i$	2000	600	50	8		0.4	0.07
Result	$\sum_i z_i \cdot B^i$	2658,47						

aus (2+3)	$\textcolor{blue}{l_p} = \textcolor{blue}{l_m} = 0$	\$l_p\$ und \$l_m\$ sind damit definiert
aus (6)	$\textcolor{blue}{l_o} = l_1$	\$l_o\$ ist damit bekannt, wenn \$l_1\$ bekannt ist
aus (7) und (3)	$l_1 - l_2 - \textcolor{blue}{0} = 0$	$\varnothing$
	$l_1 = l_2 = l_o$	$\varnothing$
	$\textcolor{blue}{l_1} = \textcolor{blue}{l_2} = \textcolor{blue}{l_o}$	mit (8) und (9): $l_{\boxed{}} = \frac{1}{R_{\boxed{}}} \cdot U_{\boxed{}}$ und (5)
	$\frac{U_1}{R_1} = \frac{U_2}{R_2} = \frac{U_A}{R_1 + R_2}$	Spannungsteilerformel, $I = \text{const.}$
(10)	$U_2 = U_A \cdot \frac{R_2}{R_1 + R_2}$	Spannungsteilerformel

\$II.\quad\$ Betrachtung der Spannungsverstärkung

aus (0)	$\$color{blue}\{A_V\}=\frac{\$color{blue}\{U_A\}}{\$color{blue}\{U_E\}}\$$	$\$quad\$$
$\$quad\$$	$\$quad\$$	$\$quad\$$
$\$quad\$$	$\$A_V=\frac{\$color{blue}\{U_A\}}{\$color{blue}\{U_E\}}\$$	mit (4): $\$U_E=U_2+U_D\$$
$\$quad\$$	$\$quad\$$	$\$quad\$$
$\$quad\$$	$\$A_V=\frac{\$color{blue}\{U_A\}}{\$color{blue}\{U_2+U_D\}}\$$	$\$quad\$$
$\$quad\$$	$\$quad\$$	$\$quad\$$
$\$quad\$$	$\$A_V=\frac{\$color{blue}\{U_A\}}{\$color{blue}\{U_2\}+U_D\$}$	mit (10): $\$U_2=\frac{\$color{blue}\{R_2\}}{\$color{blue}\{R_1+R_2\}}\$$
$\$quad\$$	$\$quad\$$	$\$quad\$$
$\$quad\$$	$\$A_V=\frac{\$color{blue}\{U_A\}}{\$color{blue}\{U_A\}+\frac{\$color{blue}\{R_2\}}{\$color{blue}\{R_1+R_2\}}+U_D\$}$	$\$quad\$$
$\$quad\$$	$\$quad\$$	$\$quad\$$
$\$quad\$$	$\$A_V=\frac{\$color{blue}\{U_A\}}{\$color{blue}\{U_A\}+\frac{\$color{blue}\{R_2\}}{\$color{blue}\{R_1+R_2\}}+U_D\$}$	$\$quad\$$
$\$quad\$$	$\$quad\$$	$\$quad\$$
$\$quad\$$	$\$A_V=\frac{\$color{blue}\{U_A\}}{\$color{blue}\{U_A\}+\frac{\$color{blue}\{R_2\}}{\$color{blue}\{R_1+R_2\}}+\$color{blue}\{U_D\}}\$$	mit (1)
$\$quad\$$	$\$quad\$$	$\$quad\$$
$\$quad\$$	$\$A_V=\frac{\$color{blue}\{U_A\}}{\$color{blue}\{U_A\}+\frac{\$color{blue}\{R_2\}}{\$color{blue}\{R_1+R_2\}}+\$color{blue}\{U_D\}}\$$	$\$quad\$$
$\$quad\$$	$\$quad\$$	$\$quad\$$
$\$quad\$$	$\$A_V=\frac{\$color{blue}\{U_A\}}{\$color{blue}\{U_A\}+\frac{\$color{blue}\{R_2\}}{\$color{blue}\{R_1+R_2\}}+\frac{\$color{blue}\{U_A\}}{\$color{blue}\{A_D\}}\$}$	$\$quad\$$
$\$quad\$$	$\$quad\$$	$\$quad\$$
$\$quad\$$	$\$A_V=\frac{\$color{blue}\{U_A\}}{\$color{blue}\{U_A\}+\frac{\$color{blue}\{R_2\}}{\$color{blue}\{R_1+R_2\}}+\frac{\$color{blue}\{U_A\}}{\$color{blue}\{A_D\}}+\frac{\$color{blue}\{U_A\}}{\$color{blue}\{A_D\}}\$}$	Erweitern mit $\frac{\$color{blue}\{1\}}{\$color{blue}\{U_A\}}\$$
$\$quad\$$	$\$quad\$$	$\$quad\$$
$\$quad\$$	$\$A_V=\frac{\$color{blue}\{1\}}{\$color{blue}\{R_2\}+\frac{\$color{blue}\{R_2\}}{\$color{blue}\{R_1+R_2\}}+\frac{\$color{blue}\{1\}}{\$color{blue}\{A_D\}}\$}$	$\$quad\$$
$\$quad\$$	$\$quad\$$	$\$quad\$$
$\$quad\$$	$\$A_V=\frac{\$color{blue}\{1\}}{\$color{blue}\{R_2\}+\frac{\$color{blue}\{R_2\}}{\$color{blue}\{R_1+R_2\}}+\frac{\$color{blue}\{1\}}{\$color{blue}\{A_D\}}\$}$	mit $\frac{\$color{blue}\{1\}}{\$color{blue}\{A_D\}} \rightarrow 0\$$
$\$quad\$$	$\$quad\$$	$\$quad\$$
$\$quad\$$	$\$A_V=\frac{\$color{blue}\{1\}}{\$color{blue}\{R_2\}+\frac{\$color{blue}\{R_2\}}{\$color{blue}\{R_1+R_2\}}\$}$	Bruch umformen
$\$quad\$$	$\$quad\$$	$\$quad\$$
$\$quad\$$	$\$A_V=\frac{\$color{blue}\{R_1+R_2\}}{\$color{blue}\{R_2\}}\$$	$\$quad\$$
$\$quad\$$	$\$quad\$$	$\$quad\$$

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