

calc_decimal_example

Student Group

First Name	Surname	Matrikel Nr.

Table of Contents

g

$\$1.\!\!\!\!\!\quad$ 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)	$\textcolor{blue}{i}_p = \textcolor{blue}{i}_m = 0$	$\$l_p$ und $\$l_m$ sind damit definiert
$\$l_{quad}^{quad}^{quad}^{quad}^{quad}^{quad}$	$\$l_{quad}^{quad}^{quad}^{quad}^{quad}^{quad}$	$\$l_{quad}^{quad}^{quad}^{quad}^{quad}^{quad}$
aus (6)	$\textcolor{blue}{i}_o = l_1$	$\$l_o$ ist damit bekannt, wenn $\$l_1$ bekannt ist
$\$l_{quad}^{quad}^{quad}^{quad}^{quad}^{quad}$	$\$l_{quad}^{quad}^{quad}^{quad}^{quad}^{quad}$	$\$l_{quad}^{quad}^{quad}^{quad}^{quad}^{quad}$
aus (7) und (3)	$\$l_1 - l_2 \cdot \textcolor{blue}{i}_0 = 0$	$\$l_{quad}$
$\$l_{quad}^{quad}^{quad}^{quad}^{quad}^{quad}$	$\$l_{quad}^{quad}^{quad}^{quad}^{quad}^{quad}$	$\$l_{quad}^{quad}^{quad}^{quad}^{quad}^{quad}$
$\$l_{quad}$	$\$l_1 = l_2 = l_o$	$\$l_{quad}$
$\$l_{quad}^{quad}^{quad}^{quad}^{quad}^{quad}$	$\$l_{quad}^{quad}^{quad}^{quad}^{quad}^{quad}$	$\$l_{quad}^{quad}^{quad}^{quad}^{quad}^{quad}$
$\$l_{quad}$	$\textcolor{blue}{i}_{l_1} = \textcolor{blue}{i}_{l_2} = \textcolor{blue}{i}_{l_o}$	mit (8) und (9): $\$l_{boxed} = \textcolor{blue}{i}_{U_{boxed}} \cdot \textcolor{blue}{i}_{R_{boxed}}$ und (5)
$\$l_{quad}^{quad}^{quad}^{quad}^{quad}^{quad}$	$\$l_{quad}^{quad}^{quad}^{quad}^{quad}^{quad}$	$\$l_{quad}^{quad}^{quad}^{quad}^{quad}^{quad}$
$\$l_{quad}$	$\frac{\textcolor{blue}{U}_1}{R_1} = \frac{\textcolor{blue}{U}_2}{R_2} = \frac{\textcolor{blue}{U}_A}{R_1 + R_2}$	Spannungsteilerformel, $\$l = \text{const.}$
$\$l_{quad}^{quad}^{quad}^{quad}^{quad}^{quad}$	$\$l_{quad}^{quad}^{quad}^{quad}^{quad}^{quad}$	$\$l_{quad}^{quad}^{quad}^{quad}^{quad}^{quad}$
(10)	$\$U_2 = U_A \cdot \frac{R_2}{R_1 + R_2}$	Spannungsteilerformel
$\$l_{quad}^{quad}^{quad}^{quad}^{quad}^{quad}$	$\$l_{quad}^{quad}^{quad}^{quad}^{quad}^{quad}$	$\$l_{quad}^{quad}^{quad}^{quad}^{quad}^{quad}$

\$II.\quad\$ Betrachtung der Spannungsverstärkung

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

From:

<https://mexle.te.hs-heilbronn.de/> - **MEXLE Wiki**

Permanent link:

[https://mexle.te.hs-heilbronn.de/introduction to digital systems/calc decimal example?rev=1631662283](https://mexle.te.hs-heilbronn.de/introduction%20to%20digital%20systems/calc%20decimal%20example?rev=1631662283)

Last update: **2021/09/15 01:31**

