Titel

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Datum

Contents

Anmerkung des Autoren

This section is not in the table of contents and is not enumerated.

Zweck Dieses Dokument blablabla.

Punkt 2 Punkt 2

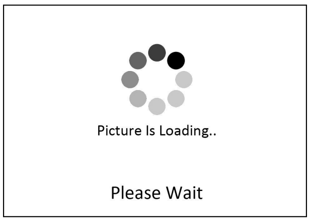

Fig. 1: Figure caption goes here

1. Section

1.1. Subsection

1.1.1. Subsubsection

Die gängigste Form der Zahlensysteme sind Stellenwertsysteme. Eine Zahl a wird in Form einer Reihe von Ziffern z_i mit dazugehöriger Potenz der Basis b^i dargestellt. Der Wert der Zahl ergibt sich dann als Summe der Werte aller Einzelstellen: $a = \sum_i z_i b^i$.

Umrechnung in andere Zahlensysteme: Gegeben sei Zahl Z, umzuwandeln in System mit Basis b. Eine angenehme Vorgehensweise gibt uns das **Horner Schema**[1]: Dividiere Z durch b. Der Rest dieser Division ist die letzte Stelle der Zahl in der Basis b (Einerstelle). Dividiere den Quotienten dieser Division wieder durch b. Der Rest dieser zweiten Division ergibt die zweite Stelle der Zahl in der neuen Basis. Wiederhole Divisionen, bis kein Rest mehr.

2. Tables

2.1. Simple

Konjunktion UND			Disjunktion ODER			Negation		NAND			NOR		
a	b	$a \wedge b$	a	b	$a \vee b$	a	$\bar{a}$	a	b	$\overline{a \wedge b}$	a	b	$\overline{a \vee b}$
0	0	0	0	0	0	0	1	0	0	1	0	0	1
0	1	0	0	1	1	1	0	0	1	1	0	1	0
1	0	0	1	0	1			1	0	1	1	0	0
1	1	1	1	1	1			1	1	0	1	1	0

2.2. With Extras and Pagebreaks

Kommutativgesetz:	$a \wedge b = b \wedge a$	$a \vee b = b \vee a$
Distributivgesetz:	$a \wedge (b \vee c) = (a \wedge b) \vee (a \wedge b)$	$a \vee (b \wedge c) = (a \vee b) \wedge (a \vee c)$

[1] Website mit Umrechnungen und Erklärungen: `http://www.arndt-bruenner.de/mathe/scripts/Zahlensysteme.htm`

Neutrales Element	$a \wedge 1 = a$	$a \vee 0 = a$
Inverses Element	$a \wedge \bar{a} = 0$	$a \vee \bar{a} = 1$
Assoziativgesetz	$(a \wedge b) \wedge c = a \wedge (b \wedge c)$	$(a \vee b) \vee c = a \vee (b \vee c)$
Idempotenzgesetz	$a \wedge a = a$	$a \vee a = a$
Absorptionsgesetz	$a \wedge (a \vee b) = a$	$a \vee (a \wedge b) = a$
DeMorgan-Gesetz	$\overline{a \wedge b} = \bar{a} \vee \bar{b}$ (NAND)	$\overline{a \vee b} = \bar{a} \wedge \bar{b}$ (NOR)
Gesetz vom Widerspruch		$a \wedge \overline{a} = 0$
Gesetz vom ausgeschl. Dritten		$a \vee \overline{a} = 1$
Gesetz der doppelten Negation		$\overline{\overline{a}} = a$

3. Two images, columns

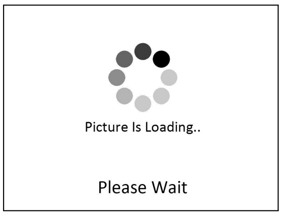

Fig. 2: RS-Flipflop

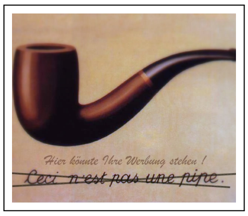

Fig. 3: getaktetes RS-Flipflop

Dabei müssen wir eine Nebenbedingung $R \wedge S = 0$ setzen - R und S dürfen niemals gleichzeitig $= 1$ sein. In der Realisierung, dargestellt in Abb. 2, führt dies zu oszillationen.

Will man ein taktgesteuertes RS-Flipflop, so braucht man lediglich das Taktsignal mit einem UND-Gatter jeweils mit dem R- und S-Eingang zu verbinden (siehe Abb. 3).

This is the first column.

This is still in the first column.

$$a + b = c \tag{1}$$
$$d + e = e \tag{2}$$

This is the second column. Blablabla.

$$a + b = c$$
$$d + e = e$$

4. Including files

Using `\include{file}` or `input{file}`.

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Vivamus porta lectus nec ante convallis lacinia. Nunc lobortis eu lacus nec euismod. Mauris at dapibus leo. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Phasellus egestas luctus sapien ac venenatis. Sed maximus pellentesque arcu non ultrices. Aliquam erat volutpat. Nam pharetra orci in sem consequat, a dictum metus eleifend. Morbi non odio libero. Morbi porttitor in purus quis commodo. Aliquam erat volutpat. Nunc vitae arcu tempus, aliquet elit sit amet, rutrum diam. Curabitur imperdiet elementum iaculis. Vestibulum suscipit interdum libero, id ultrices est semper vitae.

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5. Text in Boxes

needs package mdframed.

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6. Bibliography and Citing

Einstein said something importantEinstein 1905 and so did Dirac Dirac 1981.
So they both said something important Dirac 1981; Einstein 1905.
And this is a reference to the glossary entry of computer.

7. Mathematics and Symbols

7.1. Special characters and symbols

$$\equiv \ll \lll \gg \ggg \leq \geq \leqslant \geqslant \propto \approx \approxeq \neq \simeq \cong \ncong \widehat{=} \overset{!}{=} \tag{3}$$

$$\cdot \ \times \ \vee \ \wedge \ \veebar \ \barwedge \pm \ \mp \sqrt{a} \ \sqrt[3]{a} \ \langle \ \rangle \ \infty \tag{4}$$

$$\leftarrow \rightarrow \Leftarrow \Rightarrow \parallel \ \perp \tag{5}$$

$$\in \notin \ \forall \exists \nexists \ \ni \subset \supset \subseteq \supseteq \tag{6}$$

$$\mathcal{H} \ \mathcal{L} \ \mathcal{S} \ \mathcal{T} \ \mathcal{Q} \ \mathcal{O} \ \mathbb{R} \ \mathbb{N} \ \mathbb{Z} \tag{7}$$

$$\mathbb{R} \ \mathbb{N} \ \mathbb{Z} \ \mathbb{1} \quad \mathbb{C} \tag{8}$$

$$\int\limits_1^2 \ \oint \ \iint \ \iiint \ \prod \sum \tag{9}$$

$$\vec{r} \ \bar{r} \ \dot{r} \ \ddot{r} \ \mathbf{r} \ \underline{r} \tag{10}$$

$$\odot \ \ \nabla \ \partial \ \hbar \ \mathcal{O} \tag{11}$$

7.2. Equations and Special Stuff

$$\vec{S}_\mu = \vec{S}_\mu^{\parallel}(0)\vec{u} + \vec{S}_\mu^{\perp}(0)[\cos(\omega_\mu t)\vec{v} - \sin(\omega_\mu t)\vec{w}] \tag{12}$$

$$c_V = \left.\frac{\mathrm{d}Q}{\mathrm{d}T}\right|_V \tag{13}$$

$$\vec{P} = \frac{2}{\hbar}\langle\Psi|\hat{S}|\Psi\rangle = \vec{S} \tag{14}$$

$$\Rightarrow \varphi(x) = \sum_{L=0}^{\infty}\sum_{m=-L}^{L}\sqrt{\frac{4\pi}{2L+1}}\underbrace{\int\limits_{\mathbb{R}^3}\sqrt{\frac{4\pi}{2L+1}}\rho(\vec{x}')r'^L Y_{l,m}^*(\theta',\varphi')d^3x'}_{q_{l,m}}\frac{Y_{l,m}(\theta,\varphi)}{r^{L+1}} \tag{15}$$

$$= \sum_{L=0}^{\infty} \sum_{m=-L}^{L} \sqrt{\frac{4\pi}{2L+1}} q_{l,m} \frac{Y_{l,m}(\theta,\varphi)}{r^{L+1}} \tag{16}$$

$$\Rightarrow q_{0,0} = \int_{\mathbb{R}^3} \rho(\vec{x}')d^3x' \mathrel{\widehat{=}} \begin{cases} \text{total charge (electrostatics)} \\ \text{total mass (gravitation)} \end{cases}$$

$$\vec{r} = \begin{pmatrix} r\cos\varphi\sin\theta \\ r\sin\varphi\sin\theta \\ r\cos\varphi \end{pmatrix} \tag{17}$$

$$... = \begin{vmatrix} -1-\lambda & 1 & -1 \\ 2 & -1-\lambda & 2 \\ 2 & 2 & -1-\lambda \end{vmatrix} \tag{18}$$

$$\begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix} = \begin{pmatrix} 0 & 1 & -1 \\ 2 & 0 & 2 \\ 2 & 2 & 0 \end{pmatrix} \begin{pmatrix} x_1 \\ y_1 \\ z_1 \end{pmatrix} \tag{19}$$

$$\begin{aligned} z + \bar{z} &\leq 2\sqrt{z\bar{z}} && :2 \\ Re(z) &\leq |z| = \sqrt{Re(z)^2 + Im(z)^2} && \square \end{aligned}$$

$$|\sin z| \overset{3b)}{=} \sqrt{\sin^2 x} \tag{20}$$

$$\cosh(y) \overset{y\in\mathbb{R}}{\geq} 1 \Rightarrow x = n\pi, n \in \mathbb{Z} \tag{21}$$

$$f(z) = \lim_{x\to\infty} \frac{\sin x}{x} = 0 \tag{22}$$

$$f^{(n)}(z_0) = \frac{n!}{2\pi i} \oint_C \frac{f(z)}{(z-z_0)^{n+1}} \tag{23}$$

$$\binom{a}{n} = \frac{a!}{(a-n)!n!} \tag{24}$$

$$\begin{aligned}
\lim_{\epsilon\to 0}\int(z)dz &= \lim_{\epsilon\to 0}\frac{1}{4}\left[\int\frac{e^{ia(u+1)}}{u}du - \int\frac{e^{ia(u+1)}}{u+2}du\right] \\
&\overset{z=1\Rightarrow u=0}{=} \lim_{\epsilon\to 0}\frac{e^{ia}}{4}\left[\underbrace{\frac{\overbrace{e^{ia\epsilon e^{i\varphi}}}^{\to 1}}{\epsilon e^{i\varphi}} i\epsilon e^{i\varphi}}_{\to i} d\varphi - \int_{\pi}^{0}\underbrace{\frac{\overbrace{e^{ia\epsilon e^{i\varphi}}}^{\to 1}}{\underbrace{\epsilon e^{i\varphi}}_{\to 0}+2}\underbrace{i\epsilon e^{i\varphi}}_{\to 0}}_{\to 0} d\varphi\right] \qquad (25)\\
&2+2=4 \text{ some more space after this line please.} \qquad (26)
\end{aligned}$$

$$\begin{aligned}
2+2=4 \qquad & \text{unnumbered line.} \\
& \text{last line is made of text. Yay!} \qquad (27)
\end{aligned}$$

In-line maths elements can be set with a different style: $f(x) = \dfrac{1}{1+x}$. The same is true the other way around:

$$\begin{gathered}
f(x) = \sum_{i=0}^{n}\frac{a_i}{1+x} \\
\textstyle f(x) = \sum_{i=0}^{n}\frac{a_i}{1+x} \\
\scriptstyle f(x) = \sum_{i=0}^{n}\frac{a_i}{1+x} \\
\scriptscriptstyle f(x) = \sum_{i=0}^{n}\frac{a_i}{1+x}
\end{gathered}$$

Two columns: Version 1

$$\begin{array}{cc}
\text{Column 1} & \text{Column 2} \\
a = b + c & 2a = b + c \\
a = b + c & 2a = b + c
\end{array} \tag{28}$$

Version 2:

This is the first column.

This is still in the first column.

$$a + b = c \tag{29}$$

$$d + e = e \tag{30}$$

This is the second column.

$$a + b = c \tag{31}$$

$$d + e = e \tag{32}$$

8. Pseudocode

Algorithm 1 My algorithm

```
procedure UNBINDING ROUTINE
    stringlen ← length of string
    i ← patlen
top:
    if i > stringlen then return false
    j ← patlen
other loop:
    while i < j do:
        i ← i + 1                                    ▷ This is a comment.
        for all elements ∈ list do
            Do something.
functions:
    function MYFUNC(x,y)
        x = y-2 return x
```

A. Image appendix

Fig. A1: Draft option

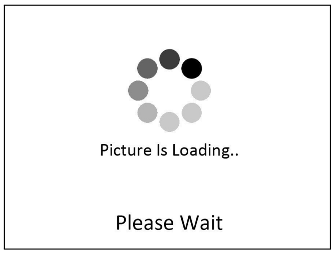

Fig. A2: JK-Flipflop, Darstellung mit RS-Flipflop. C = Takt, $Q_1 = Q$, $Q_2 = \bar{Q}$

B. Line break

asdfghjklösdfghjklösdfghjklöasdfghjklösdfghjklösdfghj111klöasdfghjklösdfghjklösdfghjklöasd222-fghjklösdfghjklösdfghjklöasdfghjklösdfghjklösdfghjklöasdfghjklösdfghjklö

C. Defining new commands

μSR

myint	$\int\limits_{-\infty}^{\infty} dr \int\limits_{0}^{2\pi} \sin(\vartheta)\varepsilon d\varphi$
mysum	$\sum\limits_{j=0}^{\infty} \frac{x \cdot y}{z} e^{-3\cos(\theta\phi)}$

myint is now a new command and does this:

phat hello
cursive hallo

References

Dirac, Paul Adrien Maurice (1981). *The Principles of Quantum Mechanics*. International series of monographs on physics. Clarendon Press. ISBN: 9780198520115.

Einstein, Albert (1905). "Zur Elektrodynamik bewegter Körper. (German) [On the electrodynamics of moving bodies]". In: *Annalen der Physik* 322.10, pp. 891–921. DOI: `http://dx.doi.org/10.1002/andp.19053221004`.

Knuth, Donald. *Knuth: Computers and Typesetting*. URL: `http://www-cs-faculty.stanford.edu/~uno/abcde.html`.

Knuth, Donald E. (1973). "Fundamental Algorithms". In: Addison-Wesley. Chap. 1.2.