

Mathtools

Paket

```
\usepackage{mathtools}
```

bindet folgende Pakete ein

keyval, calc, mhsetup, amsmath, graphicx

Inhalt

Löst Probleme von Amsmath

und

bringt neue Befehle und Umgebungen mit

drunter und drüber

Underbracket

`\underbracket [Dicke] [Hoehe] {Oben}_ {Unten}`

Unter...

`$\underbracket{a+\dots+a}_ {\text{n-mal}} = na $`

$$\underbrace{a + \dots + a}_{n\text{-mal}} = na$$

`$\underbracket [0.5pt] [5pt] {a+\dots+a}_ {\text{n-mal}} = na $`

$$\underbrace{a + \dots + a}_{n\text{-mal}} = na$$

drunter und drüber

Overbracket

`\overbracket [Dicke] [Hoehe] {Unten}^{\text{Oben}}`

über...

`$\overbracket{a+\dots+a}^{\text{n-mal}} = na $`

$$\overbracket{a + \dots + a} = na$$

`$\overbracket [0.5pt] [5pt] {a+\dots+a}^{\text{n-mal}} = na $`

$$\overbracket [0.5pt] [5pt]{a + \dots + a} = na$$

Matrizen

ohne

Rechts

```

$$\begin{matrix} -a_1 & a_2 \\ b_1 & -b_2 \end{matrix}$$

```

$$\begin{matrix} -a_1 & a_2 \\ b_1 & -b_2 \end{matrix}$$

Zentriert

```

$$\begin{matrix} -a_1 & a_2 \\ b_1 & -b_2 \end{matrix}$$

```

$$\begin{matrix} -a_1 & a_2 \\ b_1 & -b_2 \end{matrix}$$

Links

```

$$\begin{matrix} -a_1 & a_2 \\ b_1 & -b_2 \end{matrix}$$

```

$$\begin{matrix} -a_1 & a_2 \\ b_1 & -b_2 \end{matrix}$$

normal

Rechts

```
\begin{pmatrix*}[r]
-a_{1} & a_{2} \\
b_{1} & -b_{2}
\end{pmatrix*}
```

$$\begin{pmatrix} -a_1 & a_2 \\ b_1 & -b_2 \end{pmatrix}$$

Zentriert

```
\begin{pmatrix*}[c]
-a_{1} & a_{2} \\
b_{1} & -b_{2}
\end{pmatrix*}
```

$$\begin{pmatrix} -a_1 & a_2 \\ b_1 & -b_2 \end{pmatrix}$$

Links

```
\begin{pmatrix*}[l]
-a_{1} & a_{2} \\
b_{1} & -b_{2}
\end{pmatrix*}
```

$$\begin{pmatrix} -a_1 & a_2 \\ b_1 & -b_2 \end{pmatrix}$$

[-Klammern

Rechts

```
$$\begin{bmatrix}r  
-a_{1} & a_{2} \\  
b_{1} & -b_{2}  
\end{bmatrix}$$
```

$$\begin{bmatrix} -a_1 & a_2 \\ b_1 & -b_2 \end{bmatrix}$$

Zentriert

```
$$\begin{bmatrix}c  
-a_{1} & a_{2} \\  
b_{1} & -b_{2}  
\end{bmatrix}$$
```

$$\begin{bmatrix} -a_1 & a_2 \\ b_1 & -b_2 \end{bmatrix}$$

Links

```
$$\begin{bmatrix}l  
-a_{1} & a_{2} \\  
b_{1} & -b_{2}  
\end{bmatrix}$$
```

$$\begin{bmatrix} -a_1 & a_2 \\ b_1 & -b_2 \end{bmatrix}$$

{-Klammern

Rechts

```
$$\begin{Bmatrix*}[r]  
-a_{1} & a_{2} \\  
b_{1} & -b_{2}  
\end{Bmatrix*}$$
```

$$\begin{Bmatrix} -a_1 & a_2 \\ b_1 & -b_2 \end{Bmatrix}$$

Zentriert

```
$$\begin{Bmatrix*}[c]  
-a_{1} & a_{2} \\  
b_{1} & -b_{2}  
\end{Bmatrix*}$$
```

$$\begin{Bmatrix} -a_1 & a_2 \\ b_1 & -b_2 \end{Bmatrix}$$

Links

```
$$\begin{Bmatrix*}[l]  
-a_{1} & a_{2} \\  
b_{1} & -b_{2}  
\end{Bmatrix*}$$
```

$$\begin{Bmatrix} -a_1 & a_2 \\ b_1 & -b_2 \end{Bmatrix}$$

| - Klammern

Rechts

```
 $\begin{vmatrix*}[r]  
 -a_{1} & a_{2} \\  
 b_{1} & -b_{2}  
 \end{vmatrix*} $
```

$$\begin{vmatrix} -a_1 & a_2 \\ b_1 & -b_2 \end{vmatrix}$$

Zentriert

```
 $\begin{vmatrix*}[c]  
 -a_{1} & a_{2} \\  
 b_{1} & -b_{2}  
 \end{vmatrix*} $
```

$$\begin{vmatrix} -a_1 & a_2 \\ b_1 & -b_2 \end{vmatrix}$$

Links

```
 $\begin{vmatrix*}[l]  
 -a_{1} & a_{2} \\  
 b_{1} & -b_{2}  
 \end{vmatrix*} $
```

$$\begin{vmatrix} -a_1 & a_2 \\ b_1 & -b_2 \end{vmatrix}$$

||-Klammern

Rechts

```
 $\begin{Vmatrix*}[r]  
 -a_{1} & a_{2} \\\br/> b_{1} & -b_{2}  
 \end{Vmatrix*} $
```

$$\begin{vmatrix} -a_1 & a_2 \\ b_1 & -b_2 \end{vmatrix}$$

Zentriert

```
 $\begin{Vmatrix*}[c]  
 -a_{1} & a_{2} \\\br/> b_{1} & -b_{2}  
 \end{Vmatrix*} $
```

$$\begin{vmatrix} -a_1 & a_2 \\ b_1 & -b_2 \end{vmatrix}$$

Links

```
 $\begin{Vmatrix*}[l]  
 -a_{1} & a_{2} \\\br/> b_{1} & -b_{2}  
 \end{Vmatrix*} $
```

$$\begin{vmatrix} -a_1 & a_2 \\ b_1 & -b_2 \end{vmatrix}$$

Matrix im Text

kleine Matrix

Xsmallmatrix

Befehl

This text $\begin{smallmatrix} [Ausrichtung:r,c,l] \\ -a&b \\ c&-d \end{smallmatrix}$ \$ is only for showing.

Beispiel

Der Text ist $\begin{smallmatrix} [r] \\ -a&b \\ c&-d \end{smallmatrix}$ \$ nur Fassade.

Der Text ist $\begin{matrix} -a & b \\ c & -d \end{matrix}$ nur Fassade.

Matrix im Text

ohne Ausrichtung Teil 1

This text `\begin{psmallmatrix}`
`-a&b\\ c&-d \end{psmallmatrix}` is only for showing.

This text $\begin{pmatrix} -a & b \\ c & -d \end{pmatrix}$ is only for showing.

This text `\begin{bsmallmatrix}`
`-a&b\\ c&-d \end{bsmallmatrix}` is only for showing.

This text $\begin{bmatrix} -a & b \\ c & -d \end{bmatrix}$ is only for showing.

This text `\begin{Bsmallmatrix}`
`-a&b\\ c&-d \end{Bsmallmatrix}` is only for showing.

This text $\begin{Bmatrix} -a & b \\ c & -d \end{Bmatrix}$ is only for showing.

Matrix im Text

ohne Ausrichtung Teil 2

This text $\begin{vsmatrix} -a&b \\ c&-d \end{vsmatrix}$ is only for showing.

This text $\begin{vmatrix} -a & b \\ c & -d \end{vmatrix}$ is only for showing.

This text $\begin{Vsmatrix} -a&b \\ c&-d \end{Vsmatrix}$ is only for showing.

This text $\begin{Vvmatrix} -a & b \\ c & -d \end{Vvmatrix}$ is only for showing.

Matrix im Text mit Ausrichtung

`\begin{psmallmatrix*}[r] -a&b \\ c&-d \end{psmallmatrix*}`\$

$$\begin{pmatrix} -a & b \\ c & -d \end{pmatrix}$$

`\begin{bsmallmatrix*}[r] -a&b \\ c&-d \end{bsmallmatrix*}`\$

$$\begin{bmatrix} -a & b \\ c & -d \end{bmatrix}$$

`\begin{Bsmallmatrix*}[r] -a&b \\ c&-d \end{Bsmallmatrix*}`\$

$$\begin{Bmatrix} -a & b \\ c & -d \end{Bmatrix}$$

`\begin{vsmallmatrix*}[r] -a&b \\ c&-d \end{vsmallmatrix*}`\$

$$\begin{vmatrix} -a & b \\ c & -d \end{vmatrix}$$

`\begin{Vsmallmatrix*}[r] -a&b \\ c&-d \end{Vsmallmatrix*}`\$

$$\begin{Vmatrix} -a & b \\ c & -d \end{Vmatrix}$$

Fallunterscheidung

*-Variante → Zweite Spalte ist Text

Cases bisher

```
$f(x) = \begin{cases} 5 & \text{1. Fall} \\ 23 & \text{2. Fall} \end{cases}$
```

$$f(x) = \begin{cases} 5 & \text{1. Fall} \\ 23 & \text{2. Fall} \end{cases}$$

Cases neu

```
$f(x) = \begin{cases*} 5 & \text{1. Fall} \\ 23 & \text{2. Fall} \end{cases}$
```

$$f(x) = \begin{cases*} 5 & \text{1. Fall} \\ 23 & \text{2. Fall} \end{cases}$$

Fallunterscheidung

verbesserte Darstellung

Cases bisher

```
$f(x) = \begin{cases} 5 & x \geq 0 \\ \int x^2 \ dx & \text{sonst} \end{cases}$
```

$$f(x) = \begin{cases} 5 & x \geq 0 \\ \int x^2 \ dx & \text{sonst} \end{cases}$$

Cases neu

```
$f(x) = \begin{dcases} 5 & x \geq 0 \\ \int x^2 \ dx & \text{sonst} \end{dcases}$
```

$$f(x) = \begin{cases} 5 & x \geq 0 \\ \int x^2 \ dx & \text{sonst} \end{cases}$$

Fallunterscheidung

verbesserte Darstellung und Textspalte

Cases bisher

```
$f(x) = \begin{cases} 5 & \text{1. Fall} \\ \int x^2 dx & \text{2. Fall} \end{cases}$
```

$$f(x) = \begin{cases} 5 & \text{1. Fall} \\ \int x^2 dx & \text{2. Fall} \end{cases}$$

Cases neu

```
$f(x) = \begin{dcases*} 5 & \text{1. Fall} \\ \int x^2 dx & \text{2. Fall} \end{dcases*}$
```

$$f(x) = \begin{cases} 5 & \text{1. Fall} \\ \int x^2 dx & \text{2. Fall} \end{cases}$$

Fallunterscheidung rechts

Cases rechts

```
$$\begin{rcases}
  5 & \text{1. Fall} \\
  23 & \text{2. Fall}
\end{rcases} \Rightarrow
```

$$\left. \begin{array}{l} 5 \\ 23 \end{array} \right\} \begin{array}{l} \text{1. Fall} \\ \text{2. Fall} \end{array} \Rightarrow$$

rechts mit Textspalte

```
$$\begin{rcases*}
  5 & \text{1. Fall} \\
  23 & \text{2. Fall}
\end{rcases*} \Rightarrow
```

$$\left. \begin{array}{l} 5 \\ 23 \end{array} \right\} \begin{array}{l} \text{1. Fall} \\ \text{2. Fall} \end{array} \Rightarrow$$

Fallunterscheidung rechts

Verbesserte Darstellung

Cases rechts

```
$$\begin{drcases}
  x^2 & \text{1. Fall} \\
 \int x \, dx & \text{2. Fall}
\end{drcases} \Rightarrow
```

$$\left. \begin{array}{l} x^2 \\ \int x \, dx \end{array} \right\} \begin{array}{l} \text{1. Fall} \\ \text{2. Fall} \end{array} \Rightarrow$$

rechts mit Textspalte

```
$$\begin{drcases*}
  x^2 & \text{1. Fall} \\
 \int x \, dx & \text{2. Fall}
\end{drcases*} \Rightarrow
```

$$\left. \begin{array}{l} x^2 \\ \int x \, dx \end{array} \right\} \begin{array}{l} \text{1. Fall} \\ \text{2. Fall} \end{array} \Rightarrow$$

Text in Gleichungen / Formeln

bisher:

```
\begin{align*}
a - b &\geq 0 \\
\intertext{andernfalls gilt}
a - b &< 0
\end{align*}
```

$$a - b \geq 0$$

andernfalls gilt

$$a - b < 0$$

neu:

```
\begin{align*}
a - b &\geq 0 \\
\shortintertext{andernfalls gilt}
a - b &< 0
\end{align*}
```

$$a - b \geq 0$$

andernfalls gilt

$$a - b < 0$$

Amsmath

```
\[  
\begin{gathered}  
[p] = 100 \\[v] = 200  
\end{gathered}  
\]
```

$$= 100$$
$$[v] = 200$$

Mathtools

```
\[  
\begin{gathered}  
[p] = 100 \\  
[v] = 200  
\end{gathered}  
\]
```

$$[p] = 100$$

$$[v] = 200$$

Amsmath

```
\[  
X = \sum_{1\leq i\leq j\leq n} X_{ij}  
\]
```

$$X = \sum_{1\leq i\leq j\leq n} X_{ij}$$

Mathtools

```
\[  
X = \sum_{\mathllap{1\le i\le j\le n}} X_{ij}  
\]
```

$$X = \sum_{1 \leq i \leq j \leq n} X_{ij}$$

```
\[  
X = \sum_{\mathrlap{1\le i\le j\le n}} X_{ij}  
\]
```

$$X = \sum_{1 \leq i \leq j \leq n} X_{ij}$$

```
\[  
X = \sum_{\mathclap{1\le i\le j\le n}} X_{ij}  
\]
```

$$X = \sum_{1 \leq i \leq j \leq n} X_{ij}$$

Amsmath

```
\begin{equation}  
  \sum_{i=0}^n Y^{e^{i^2}}  
\end{equation}
```

$$\sum_{i=0}^n Y^{e^{i^2}} \quad (1)$$

Mathtools

```
\begin{equation}  
  \sum_{i=0}^n \cramped{Y^{e^{i^2}}}  
\end{equation}
```

$$\sum_{i=0}^n Y^{e^{i^2}} \tag{1}$$

Mathtools

```
\[  
y^{y} \text{ vs. } \cramped{y^{y}}  
\]
```

y^y vs. y^y

Amsmath

```
\[  
X = \sum_{a^2 \leq b^2 \leq c^2} \dots  
\]
```

$$X = \sum_{a^2 \leq b^2 \leq c^2} \dots$$

Mathtools

```
\[  
X = \sum_{\crampedllap{a^{2}\le b^{2}\le c^{2}}}\ldots  
\]
```

$$X = \sum_{a^2 \leq b^2 \leq c^2} \dots$$

```
\[  
X = \sum_{\crampedrlap{a^{2}\le b^{2}\le c^{2}}}\ldots  
\]
```

$$X = \sum_{a^2 \leq b^2 \leq c^2} \dots$$

```
\[  
X = \sum_{\crampedclap{a^{2}\le b^{2}\le c^{2}}}\ldots  
\]
```

$$X = \sum_{a^2 \leq b^2 \leq c^2} \dots$$

ohne exscale Paket

tiny

$$\int_a^b \dots = \sum_{i=0}^n \dots$$

scriptsize

$$\int_a^b \dots = \sum_{i=0}^n \dots$$

footnotesize

$$\int_a^b \dots = \sum_{i=0}^n \dots$$

small

$$\int_a^b \dots = \sum_{i=0}^n \dots$$

normalize

$$\int_a^b \dots = \sum_{i=0}^n \dots$$

large

$$\int_a^b \dots = \sum_{i=0}^n \dots$$

Large

$$\int_a^b \dots = \sum_{i=0}^n \dots$$

LARGE

$$\int_a^b \dots = \sum_{i=0}^n \dots$$

huge

$$\int_a^b \dots = \sum_{i=0}^n \dots$$

Huge

$$\int_a^b \dots = \sum_{i=0}^n \dots$$

mit exscale Paket

tiny

$$\int_a^b \dots = \sum_{i=0}^n \dots$$

scriptsize

$$\int_a^b \dots = \sum_{i=0}^n \dots$$

footnotesize

$$\int_a^b \dots = \sum_{i=0}^n \dots$$

small

$$\int_a^b \dots = \sum_{i=0}^n \dots$$

normalsize

$$\int_a^b \dots = \sum_{i=0}^n \dots$$

large

$$\int_a^b \dots = \sum_{i=0}^n \dots$$

Large

$$\int_a^b \dots = \sum_{i=0}^n \dots$$

LARGE

$$\int_a^b \dots = \sum_{i=0}^n \dots$$

huge

$$\int_a^b \dots = \sum_{i=0}^n \dots$$

Huge

$$\int_a^b \dots = \sum_{i=0}^n \dots$$