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Chapter 1

Matrices

1.1 Row matrix

- Row matrices whose delimiters are of the default size—and not too big.

Command	Output
<code>\row{1,2}</code>	$(1 \ 2)$
<code>\row[delim=p]{1,2}</code>	$(1 \ 2)$
<code>\row[delim=b]{1,2}</code>	$[1 \ 2]$
<code>\row[delim=B]{1,2}</code>	$\{1 \ 2\}$
<code>\row[delim=v]{1,2}</code>	$ 1 \ 2 $
<code>\row[delim=V]{1,2}</code>	$\ 1 \ 2\ $

- Row matrices with default sized delimiters, which are too small.

Command	Output
<code>\row{\frac{1}{2}, \frac{1}{3}}</code>	$(\frac{1}{2} \ \frac{1}{3})$
<code>\row[delim=p]{\frac{1}{2}, \frac{1}{3}}</code>	$(\frac{1}{2} \ \frac{1}{3})$
<code>\row[delim=b]{\frac{1}{2}, \frac{1}{3}}</code>	$[\frac{1}{2} \ \frac{1}{3}]$
<code>\row[delim=B]{\frac{1}{2}, \frac{1}{3}}</code>	$\{\frac{1}{2} \ \frac{1}{3}\}$
<code>\row[delim=v]{\frac{1}{2}, \frac{1}{3}}</code>	$ \frac{1}{2} \ \frac{1}{3} $
<code>\row[delim=V]{\frac{1}{2}, \frac{1}{3}}</code>	$\ \frac{1}{2} \ \frac{1}{3} \ $

- Row matrices with scaled delimiters.

Command	Output	Correct output
<code>\row*{\frac{1}{2}, \frac{1}{3}}</code>	$\left(\frac{1}{2} \ \frac{1}{3}\right)$	$\left(\frac{1}{2} \ \frac{1}{3}\right)$
<code>\row*[delim=p]{\frac{1}{2}, \frac{1}{3}}</code>	$\left(\frac{1}{2} \ \frac{1}{3}\right)$	$\left(\frac{1}{2} \ \frac{1}{3}\right)$
<code>\row*[delim=b]{\frac{1}{2}, \frac{1}{3}}</code>	$[\frac{1}{2} \ \frac{1}{3}]$	$[\frac{1}{2} \ \frac{1}{3}]$
<code>\row*[delim=B]{\frac{1}{2}, \frac{1}{3}}</code>	$\{\frac{1}{2} \ \frac{1}{3}\}$	$\{\frac{1}{2} \ \frac{1}{3}\}$
<code>\row*[delim=v]{\frac{1}{2}, \frac{1}{3}}</code>	$ \frac{1}{2} \ \frac{1}{3} $	$ \frac{1}{2} \ \frac{1}{3} $
<code>\row*[delim=V]{\frac{1}{2}, \frac{1}{3}}</code>	$\ \frac{1}{2} \ \frac{1}{3} \ $	$\ \frac{1}{2} \ \frac{1}{3} \ $

4. Row matrices with manually scaled delimiters.

Command	Output
<code>\row[delim-size=\Big]{\dfrac{1}{2}, \dfrac{1}{3}}</code>	$\left(\begin{array}{cc} 1 & 1 \\ 2 & 3 \end{array}\right)$
<code>\row[delim=p,delim-size=\Big]{\dfrac{1}{2}, \dfrac{1}{3}}</code>	$\left(\begin{array}{cc} 1 & 1 \\ 2 & 3 \end{array}\right)$
<code>\row[delim=b,delim-size=\Big]{\dfrac{1}{2}, \dfrac{1}{3}}</code>	$\left[\begin{array}{cc} 1 & 1 \\ 2 & 3 \end{array}\right]$
<code>\row[delim=B,delim-size=\Big]{\dfrac{1}{2}, \dfrac{1}{3}}</code>	$\left\{\begin{array}{cc} 1 & 1 \\ 2 & 3 \end{array}\right\}$
<code>\row[delim=v,delim-size=\Big]{\dfrac{1}{2}, \dfrac{1}{3}}</code>	$\left \begin{array}{cc} 1 & 1 \\ 2 & 3 \end{array}\right $
<code>\row[delim=V,delim-size=\Big]{\dfrac{1}{2}, \dfrac{1}{3}}</code>	$\left\ \begin{array}{cc} 1 & 1 \\ 2 & 3 \end{array}\right\ $

1.2 Column matrix

1. Column matrices whose delimiters are of the default size—and not too big.

Command	Output	Correct output
<code>\col{}</code>	$) ($	$)($
<code>\col{~}</code>	$()$	$()$
<code>\col{1}</code>	(1)	
<code>\col[delim=p]{1}</code>	(1)	
<code>\col[delim=b]{1}</code>	$[1]$	
<code>\col[delim=B]{1}</code>	$\{1\}$	
<code>\col[delim=v]{1}</code>	$ 1 $	
<code>\col[delim=V]{1}</code>	$\ 1\ $	

2. Column matrices with default sized delimiters, which are too small.

Command	Output
<code>\col{\dfrac{1}{2}}</code>	$\left(\begin{array}{c} 1 \\ 2 \end{array}\right)$
<code>\col[delim=p]{\dfrac{1}{2}}</code>	$\left(\begin{array}{c} 1 \\ 2 \end{array}\right)$
<code>\col[delim=b]{\dfrac{1}{2}}</code>	$\left[\begin{array}{c} 1 \\ 2 \end{array}\right]$
<code>\col[delim=B]{\dfrac{1}{2}}</code>	$\left\{\begin{array}{c} 1 \\ 2 \end{array}\right\}$
<code>\col[delim=v]{\dfrac{1}{2}}</code>	$\left \begin{array}{c} 1 \\ 2 \end{array}\right $
<code>\col[delim=V]{\dfrac{1}{2}}</code>	$\left\ \begin{array}{c} 1 \\ 2 \end{array}\right\ $

3. Column matrices with scaled delimiters.

Command	Output
<code>\col*{\frac{1}{2}}</code>	$\left(\begin{array}{c} 1 \\ 2 \end{array}\right)$
<code>\col*[delim=p]{\frac{1}{2}}</code>	$\left(\begin{array}{c} 1 \\ 2 \end{array}\right)$
<code>\col*[delim=b]{\frac{1}{2}}</code>	$\left[\begin{array}{c} 1 \\ 2 \end{array}\right]$
<code>\col*[delim=B]{\frac{1}{2}}</code>	$\left\{\begin{array}{c} 1 \\ 2 \end{array}\right\}$
<code>\col*[delim=v]{\frac{1}{2}}</code>	$\left \begin{array}{c} 1 \\ 2 \end{array}\right $
<code>\col*[delim=V]{\frac{1}{2}}</code>	$\left\ \begin{array}{c} 1 \\ 2 \end{array}\right\ $

4. Column matrices with (automatically) scaled delimiters.

Command	Output
<code>\col{1;2}</code>	$\left(\begin{array}{c} 1 \\ 2 \end{array}\right)$
<code>\col[delim=p]{1;2}</code>	$\left(\begin{array}{c} 1 \\ 2 \end{array}\right)$
<code>\col[delim=b]{1;2}</code>	$\left[\begin{array}{c} 1 \\ 2 \end{array}\right]$
<code>\col[delim=B]{1;2}</code>	$\left\{\begin{array}{c} 1 \\ 2 \end{array}\right\}$
<code>\col[delim=v]{1;2}</code>	$\left \begin{array}{c} 1 \\ 2 \end{array}\right $
<code>\col[delim=V]{1;2}</code>	$\left\ \begin{array}{c} 1 \\ 2 \end{array}\right\ $

5. Column matrices with manually scaled delimiters.

Command	Output
<code>\col[delim-size=\Big]{\frac{1}{2}}</code>	$\left(\begin{array}{c} 1 \\ 2 \end{array}\right)$
<code>\col[delim=p,delim-size=\Big]{\frac{1}{2}}</code>	$\left(\begin{array}{c} 1 \\ 2 \end{array}\right)$
<code>\col[delim=b,delim-size=\Big]{\frac{1}{2}}</code>	$\left[\begin{array}{c} 1 \\ 2 \end{array}\right]$
<code>\col[delim=B,delim-size=\Big]{\frac{1}{2}}</code>	$\left\{\begin{array}{c} 1 \\ 2 \end{array}\right\}$
<code>\col[delim=v,delim-size=\Big]{\frac{1}{2}}</code>	$\left \begin{array}{c} 1 \\ 2 \end{array}\right $
<code>\col[delim=V,delim-size=\Big]{\frac{1}{2}}</code>	$\left\ \begin{array}{c} 1 \\ 2 \end{array}\right\ $

Command	Output
<code>\col[delim-size=\Big]{1;2}</code>	$\begin{pmatrix} 1 \\ 2 \end{pmatrix}$
<code>\col[delim=p,delim-size=\Big]{1;2}</code>	$\begin{pmatrix} 1 \\ 2 \end{pmatrix}$
<code>\col[delim=b,delim-size=\Big]{1;2}</code>	$\begin{bmatrix} 1 \\ 2 \end{bmatrix}$
<code>\col[delim=B,delim-size=\Big]{1;2}</code>	$\left\{ \begin{array}{l} 1 \\ 2 \end{array} \right\}$
<code>\col[delim=v,delim-size=\Big]{1;2}</code>	$\begin{vmatrix} 1 \\ 2 \end{vmatrix}$
<code>\col[delim=V,delim-size=\Big]{1;2}</code>	$\left\ \begin{array}{l} 1 \\ 2 \end{array} \right\ $

1.3 General matrices

1. Matrices whose delimiters are of the default size—and not too big.

Command	Output	Correct output
<code>\mat{}</code>	())(
<code>\mat{~}</code>	()	()
<code>\mat{1}</code>	(1)	
<code>\mat[delim=p]{1}</code>	(1)	
<code>\mat[delim=b]{1}</code>	[1]	
<code>\mat[delim=B]{1}</code>	{1}	
<code>\mat[delim=v]{1}</code>	1	
<code>\mat[delim=V]{1}</code>	1	
<code>\mat[delim=p]{1,2}</code>	(1 2)	
<code>\mat[delim=b]{1,2}</code>	[1 2]	
<code>\mat[delim=B]{1,2}</code>	{1 2}	
<code>\mat[delim=v]{1,2}</code>	1 2	
<code>\mat[delim=V]{1,2}</code>	1 2	

2. Matrices with default sized delimiters, which are too small.

Command	Output
<code>\mat{\frac{1}{2}}</code>	$(\frac{1}{2})$
<code>\mat[delim=p]{\frac{1}{2}}</code>	$(\frac{1}{2})$
<code>\mat[delim=b]{\frac{1}{2}}</code>	$[\frac{1}{2}]$
<code>\mat[delim=B]{\frac{1}{2}}</code>	$\{\frac{1}{2}\}$
<code>\mat[delim=v]{\frac{1}{2}}</code>	$ \frac{1}{2} $
<code>\mat[delim=V]{\frac{1}{2}}</code>	$\left\ \frac{1}{2} \right\ $
<code>\mat{\frac{1}{2}, \frac{1}{3}}</code>	$(\frac{1}{2} \quad \frac{1}{3})$
<code>\mat[delim=p]{\frac{1}{2}, \frac{1}{3}}</code>	$(\frac{1}{2} \quad \frac{1}{3})$
<code>\mat[delim=b]{\frac{1}{2}, \frac{1}{3}}</code>	$[\frac{1}{2} \quad \frac{1}{3}]$
<code>\mat[delim=B]{\frac{1}{2}, \frac{1}{3}}</code>	$\{\frac{1}{2} \quad \frac{1}{3}\}$
<code>\mat[delim=v]{\frac{1}{2}, \frac{1}{3}}</code>	$ \frac{1}{2} \quad \frac{1}{3} $
<code>\mat[delim=V]{\frac{1}{2}, \frac{1}{3}}</code>	$\left\ \frac{1}{2} \quad \frac{1}{3} \right\ $

3. Matrices with scaled delimiters.

Command	Output
<code>\mat*{\frac{1}{2}}</code>	$\left(\frac{1}{2}\right)$
<code>\mat*[delim=p]{\frac{1}{2}}</code>	$\left(\frac{1}{2}\right)$
<code>\mat*[delim=b]{\frac{1}{2}}</code>	$\left[\frac{1}{2}\right]$
<code>\mat*[delim=B]{\frac{1}{2}}</code>	$\left\{\frac{1}{2}\right\}$
<code>\mat*[delim=v]{\frac{1}{2}}</code>	$\left \frac{1}{2}\right $
<code>\mat*[delim=V]{\frac{1}{2}}</code>	$\left\ \frac{1}{2} \right\ $
<code>\mat*{\frac{1}{2}, \frac{1}{3}}</code>	$\left(\frac{1}{2} \quad \frac{1}{3}\right)$
<code>\mat*[delim=p]{\frac{1}{2}, \frac{1}{3}}</code>	$\left(\frac{1}{2} \quad \frac{1}{3}\right)$
<code>\mat*[delim=b]{\frac{1}{2}, \frac{1}{3}}</code>	$\left[\frac{1}{2} \quad \frac{1}{3}\right]$
<code>\mat*[delim=B]{\frac{1}{2}, \frac{1}{3}}</code>	$\left\{\frac{1}{2} \quad \frac{1}{3}\right\}$
<code>\mat*[delim=v]{\frac{1}{2}, \frac{1}{3}}</code>	$\left \frac{1}{2} \quad \frac{1}{3}\right $
<code>\mat*[delim=V]{\frac{1}{2}, \frac{1}{3}}</code>	$\left\ \frac{1}{2} \quad \frac{1}{3} \right\ $

4. Matrices with automatically scaled delimiters.

Command	Output
<code>\mat{1; 2}</code>	$\begin{pmatrix} 2 \\ 2 \end{pmatrix}$
<code>\mat{1,2 ; 3,4}</code>	$\begin{pmatrix} 3 & 4 \\ 3 & 4 \end{pmatrix}$
<code>\mat{\frac{1}{1},\frac{2}{2} ; \frac{3}{3},\frac{4}{4}}</code>	$\begin{pmatrix} \frac{1}{1} & \frac{2}{2} \\ \frac{3}{3} & \frac{4}{4} \end{pmatrix}$

5. Matrices with manually scaled delimiters.

Command	Output
<code>\mat[delim-size=\Big]{\frac{1}{2}}</code>	$\left(\frac{1}{2} \right)$
<code>\mat[delim=p,delim-size=\Big]{\frac{1}{2}}</code>	$\left(\frac{1}{2} \right)$
<code>\mat[delim=b,delim-size=\Big]{\frac{1}{2}}</code>	$\left[\frac{1}{2} \right]$
<code>\mat[delim=B,delim-size=\Big]{\frac{1}{2}}</code>	$\left\{ \frac{1}{2} \right\}$
<code>\mat[delim=v,delim-size=\Big]{\frac{1}{2}}</code>	$\left \frac{1}{2} \right $
<code>\mat[delim=V,delim-size=\Big]{\frac{1}{2}}</code>	$\left\ \frac{1}{2} \right\ $
<code>\mat[delim-size=\Big]{\frac{1}{2}, \frac{1}{3}}</code>	$\left(\frac{1}{2} \quad \frac{1}{3} \right)$
<code>\mat[delim=p,delim-size=\Big]{\frac{1}{2}, \frac{1}{3}}</code>	$\left(\frac{1}{2} \quad \frac{1}{3} \right)$
<code>\mat[delim=b,delim-size=\Big]{\frac{1}{2}, \frac{1}{3}}</code>	$\left[\frac{1}{2} \quad \frac{1}{3} \right]$
<code>\mat[delim=B,delim-size=\Big]{\frac{1}{2}, \frac{1}{3}}</code>	$\left\{ \frac{1}{2} \quad \frac{1}{3} \right\}$
<code>\mat[delim=v,delim-size=\Big]{\frac{1}{2}, \frac{1}{3}}</code>	$\left \frac{1}{2} \quad \frac{1}{3} \right $
<code>\mat[delim=V,delim-size=\Big]{\frac{1}{2}, \frac{1}{3}}</code>	$\left\ \frac{1}{2} \quad \frac{1}{3} \right\ $
Command	Output
<code>\mat[delim-size=\Big]{1; 2}</code>	$\begin{pmatrix} 2 \\ 2 \end{pmatrix}$
<code>\mat[delim-size=\Big]{1,2 ; 3,4}</code>	$\begin{pmatrix} 3 & 4 \\ 3 & 4 \end{pmatrix}$
<code>\mat[delim-size=\Big]{\frac{1}{1},\frac{2}{2} ; \frac{3}{3},\frac{4}{4}}</code>	$\begin{pmatrix} \frac{1}{1} & \frac{2}{2} \\ \frac{3}{3} & \frac{4}{4} \end{pmatrix}$

$$\begin{pmatrix} 2 \\ 2 \end{pmatrix}$$

1.4 Other matrix environments

$$\begin{array}{l} \backslash(\backslash mat [env=matrix*, env-opts=[1]]\{-1,3 ; 2,4\}\backslash) \\ \text{pNiceArray} \\ \left(\begin{array}{cc|cc} 2 & 4 \\ 2 & 4 \\ \hline 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \end{array} \right) \\ \\ \left(\begin{array}{cc|cc} 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \\ \hline 1 & 1 & 1 & 1 \\ 2 & 1 & 1 & 1 \end{array} \right) \\ \\ \left(\begin{array}{cc|cc} a & a & a & a \\ a & a & a & a \\ a & a & a & a \\ a & a & a & a \end{array} \right) \end{array}$$

1.5 \Widebar

$\overline{M} \ \overline{A} \ \overline{g} \ \overline{\beta} \ \overline{A}^q \ \overline{AB}^\sigma \ \overline{H}^C \ \overline{\sin z} \ \overline{W}_n$

1.6 \het

$\hat{W} \hat{A} \hat{B} \hat{\phi} \hat{x} \hat{y} A \hat{J}_{\hat{x}_{\hat{B} \hat{A} \hat{x}}}$