More on Matrix in LaTeX

Manjusha S. Joshi
Pune

June 11, 2013

$$\begin{matrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{matrix}$$

$$\begin{array}{ccc}
1 & 2 & 3\\
4 & 5 & 6\\
7 & 8 & 9
\end{array}$$

```
$$\begin{array}{ccc}
 1 & 2 & 3\\
 4 & 5 & 6\\
 7 & 8 & 9
 \end{array}$$
```

$$\begin{array}{ccc}
 1 & 2 & 3\\
 4 & 5 & 6\\
 7 & 8 & 9
 \end{array}$$

```
$$\begin{array}{ccc}
 1 & 2 & 3\\
 4 & 5 & 6\\
 7 & 8 & 9
 \end{array}$$
```

$$\begin{bmatrix}
 1 & 2 & 3\\
 4 & 5 & 6\\
 7 & 8 & 9
 \end{bmatrix}$$

$$\begin{array}{ccc}
1 & 2 & 3\\
4 & 5 & 6\\
7 & 8 & 9
\end{array}$$

```
$$\begin{array}{ccc}
 1 & 2 & 3\\
 4 & 5 & 6\\
 7 & 8 & 9
 \end{array}$$
```

$$\left[\begin{array}{ccc}
1 & 2 & 3\\
4 & 5 & 6\\
7 & 8 & 9
\end{array}\right]$$

```
$$  \left[
\begin{array}{ccc}
 1&2&3\\
 4&5&6\\
 7&8&9
\end{array}
          \right] $$
```

$$\left\{
\begin{array}{ccc}
1&2&3\\
4&5&6\\
7&8&9
\end{array}
\right\}$$

```
$$\left\{
   \begin{array}{ccc}
    1&2&3\\
    4&5&6\\
    7&8&9
   \end{array}
      \right\}$$
```

$$\left\{ \begin{array}{ccc} 1&2&3\\ 4&5&6\\ 7&8&9 \end{array} \right\}$$

```
$$\left\{
   \begin{array}{ccc}
    1&2&3\\
    4&5&6\\
    7&8&9
   \end{array}
      \right\}$$
```

$$\left(\begin{array}{ccc} 1&2&3\\ 4&5&6\\ 7&8&9 \end{array} \right)^{20}$$

$$\left\{ \begin{array}{ccc} 1&2&3\\ 4&5&6\\ 7&8&9 \end{array} \right\}$$

```
$$\left\{
   \begin{array}{ccc}
    1&2&3\\
    4&5&6\\
    7&8&9
   \end{array}
      \right\}$$
```

$$\left(\begin{array}{ccc} 1&2&3\\ 4&5&6\\ 7&8&9 \end{array} \right)^{20}$$

```
 $$ \left(
   \begin{array}{ccc}
    1&2&3\\
    4&5&6\\
    7&8&9
   \end{array}
      \right)^{20} $$
```

$$\left\|
\begin{array}{ccc}
1&2&3\\
4&5&6\\
7&8&9
\end{array}
\right\|$$

```
$$\left\|
   \begin{array}{ccc}
    1&2&3\\
    4&5&6\\
    7&8&9
   \end{array}
      \right\|$$
```

$$\left\|
\begin{array}{ccc}
1&2&3\\
4&5&6\\
7&8&9
\end{array}
\right\|$$

$$\left\langle
\begin{array}{ccc}
1&2&3\\
4&5&6\\
7&8&9
\end{array}
\right\rangle [\{20\}]$$

$$\left\|
\begin{array}{ccc}
1&2&3\\
4&5&6\\
7&8&9
\end{array}
\right\|$$

$$\left<
\begin{array}{ccc}
1&2&3\\
4&5&6\\
7&8&9
\end{array}
\right>_{[\{20\}]}$$

```
$$\left\|
   \begin{array}{ccc}
    1&2&3\\
    4&5&6\\
    7&8&9
   \end{array}
      \right\|$$
```

```
 $$ \left<
   \begin{array}{ccc}
    1&2&3\\
    4&5&6\\
    7&8&9
   \end{array}
      \right>_{[\{20\}]} $$
```

$$\left\{\lfloor \begin{array}{ccc} 1&2&3\\ 4&5&6\\ 7&8&9 \end{array} \right\rfloor\}$$

```
$$\left\{\lfloor
   \begin{array}{ccc}
    1&2&3\\
    4&5&6\\
    7&8&9
   \end{array}
      \right\rfloor\}$$
```

$$\left\{\lfloor \begin{array}{ccc} 1&2&3\\ 4&5&6\\ 7&8&9 \end{array} \right\rfloor\right\}$$

```
$$\left\{\lfloor
   \begin{array}{ccc}
    1&2&3\\
    4&5&6\\
    7&8&9
   \end{array}
      \right\rfloor\right\}$$
```

$$\left[\begin{array}{ccc} 1&2&3\\ 4&5&6\\ 7&8&9 \end{array}\right]$$

$$\left\{\lfloor \begin{array}{ccc} 1&2&3\\ 4&5&6\\ 7&8&9 \end{array} \right\rfloor$$

```
$$\left\{\lfloor
   \begin{array}{ccc}
    1&2&3\\
    4&5&6\\
    7&8&9
   \end{array}
      \right\rfloor$$
```

$$\left(\lceil \begin{array}{ccc} 1&2&3\\ 4&5&6\\ 7&8&9 \end{array} \right\rceil$$

```
 $$ \left(\lceil
   \begin{array}{ccc}
    1&2&3\\
    4&5&6\\
    7&8&9
   \end{array}
      \right\rceil $$
```

Matrix Equation

$$\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix} \times \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} = \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}$$

```
$$   \left(    \begin{array}{ccc}
                 1&2&3\\
                 4&5&6\\
                 7&8&9
               \end{array}   \right) \times
     \left(    \begin{array}{ccc}
                 1&0&0\\
                 0&1&0\\
                 0&0&1
               \end{array}  \right)   =
    \left(  \begin{array}{ccc}
                 1&2&3\\
                 4&5&6\\
                 7&8&9
            \end{array}  \right)     $$
```

Equation

$$x^2 + y^2 = z^2 \quad (1)$$

Equation

$$x^2 + y^2 = z^2 \quad (1)$$

```
\begin{equation}
    x^2+y^2=z^2
\end{equation}
```

Equation

$$x^2 + y^2 = z^2 \quad (1)$$

```
\begin{equation}
    x^2+y^2=z^2
\end{equation}
```

- Automatically enters in Math mode.

Equation

$$x^2 + y^2 = z^2 \quad (1)$$

```
\begin{equation}
    x^2+y^2=z^2
\end{equation}
```

- Automatically enters in Math mode.
- $ not required.

Equation

$$x^2 + y^2 = z^2 \quad (1)$$

```
\begin{equation}
    x^2+y^2=z^2
\end{equation}
```

- Automatically enters in Math mode.
- $ not required.
- At a time only one equation allowed.

Equation

$$x^2 + y^2 = z^2 \quad (1)$$

```
\begin{equation}
    x^2+y^2=z^2
\end{equation}
```

- Automatically enters in Math mode.
- $ not required.
- At a time only one equation allowed.
- Automatic numbering.

The nested environment:

$$Ax = \left[\begin{array}{ccc} 1.1 & 1.2 & 1.3 \\ 21.0 & 22.0 & -2.1 \end{array} \right] \left(\begin{array}{c} x_1 \\ x_2 \\ x_3 \end{array} \right). \tag{2}$$

The nested environment:

$$Ax = \left[\begin{array}{rrr} 1.1 & 1.2 & 1.3 \\ 21.0 & 22.0 & -2.1 \end{array} \right] \left(\begin{array}{c} x_1 \\ x_2 \\ x_3 \end{array} \right). \tag{2}$$

```
\begin{equation}
 Ax = \left[
      \begin{array}{rrr}
    1.1 & 1.2 & 1.3\\
    21.0 & 22 .0 & -2.1\\
     \end{array}
     \right]
    \left(
         \begin{array}{cc} x_1 \\ x_2 \\ x_3
          \end{array}
      \right).
```

Array environments can be nested. Here is an example:

$$\left[\begin{array}{ccc|cc} A_{11} & A_{12} & A_{13} & \multicolumn{2}{c}{\multirow{2}{*}{0}} \\ A_{21} & A_{22} & A_{23} & & \\ \hline \multicolumn{3}{c|}{\multirow{2}{*}{0}} & B_{11} & B_{12} \\ \multicolumn{3}{c|}{} & B_{21} & B_{22} \end{array}\right]$$

Array environments can be nested. Here is an example:

$$\left[\begin{array}{ccc|cc} A_{11} & A_{12} & A_{13} & \multicolumn{2}{c}{\multirow{2}{*}{0}} \\ A_{21} & A_{22} & A_{23} & & \\ \hline \multicolumn{3}{c|}{\multirow{2}{*}{0}} & B_{11} & B_{12} \\ & & & B_{21} & B_{22} \end{array}\right]$$

```
$$ \left[  \begin{array}{c|c}
    \begin{array}{ccc} A_{11} & A_{12} &A_{13}\\
          A_{21} &A_{22} &A_{23}
    \end{array}  % End of small upper left array
    & 0 \\ \hline  % Begin row 2 of big array
  0 & \begin{array}{cc}
    B_{11} & B_{12} \\
    B_{21} & B_{22} \\
  \end{array}  % End of small right lower array
  \end{array} %End of big array
  \right] $$
```

Now consider the following conditional assignment:

$$f(x) = \begin{cases} -1 & \text{if} \quad x < 0; \\ 0 & \text{if} \quad x = 0; \\ 1 & \text{if} \quad x > 0. \end{cases}$$

Now consider the following conditional assignment:

$$f(x) = \left\{ \begin{array}{rll} -1 & \mbox{if} & x < 0;\\ 0 & \mbox{if} & x = 0;\\ 1 & \mbox{if} & x > 0. \end{array} \right.$$

```
$$f(x) = \left\{ \begin{array}{rll}
        -1 & \mbox{if} & x < 0;\\
         0 & \mbox{if} & x = 0;\\
         1 & \mbox{if} & x > 0.\\
           \end{array}
    \right.
$$
```

Now consider the following conditional assignment:

$$f(x) = \left\{ \begin{array}{rll} -1 & \mbox{if} & x < 0;\\ 0 & \mbox{if} & x = 0;\\ 1 & \mbox{if} & x > 0. \end{array} \right.$$

```
$$f(x) = \left\{ \begin{array}{rll}
        -1 & \mbox{if} & x < 0;\\
         0 & \mbox{if} & x = 0;\\
         1 & \mbox{if} & x > 0.\\
           \end{array}
    \right.
$$
```