Vectors and matrix – creation and sizing

To create a vector (filled with zeros) use the function, **vector allocate()** using the following syntax

$$\text{vector allocate}(4\ ,\ \text{true}) = \begin{bmatrix} 0 & 0 & 0 & 0 \end{bmatrix}$$

Row vector

$$\text{vector allocate}(4\ ,\ \text{false}) = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}$$

Column vector

If we want to create a vector and fill it with some other values we use the functions **vector create()** with the following syntax

$$\text{vector create}(4\ ,\ \text{true}\ ,\ -2.3) = \begin{bmatrix} -2.3 & -2.3 & -2.3 & -2.3 \end{bmatrix}$$

Row vector

$$\text{vector create}(3\ ,\ \text{false}\ ,\ 12.54) = \begin{bmatrix} 12.54 \\ 12.54 \\ 12.54 \end{bmatrix}$$

Column vector

There are also functions **vector()** and **rvector()** that will create an empty vector with two elements

$$\begin{bmatrix} 0 \\ 0 \end{bmatrix}$$

Created with vector() function

$$\begin{bmatrix} 0 & 0 \end{bmatrix}$$

Created with rvector() function

While the cursor is in one of the empty fields of the row inside a vector use the Space bar to add an additional column to the right. With Ctrl. + Space bar combination while the cursor is in one of the empty fields the column with the mentioned field will be deleted.

$$\begin{bmatrix} 1 & 0 \end{bmatrix}$$

Starting row vector

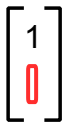
$$\begin{bmatrix} 1 & 0 & 0 \end{bmatrix}$$

After using of Space key

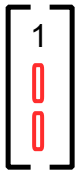
$$\begin{bmatrix} 1 & 0 \end{bmatrix}$$

After using of Ctrl. + Space key combination

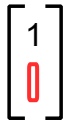
The same operation can be done on column vectors, except we will have to use Ctrl. + Enter key combination for adding and deleting rows respectively.



Starting row vector



After using of Enter key



After using of Ctrl. +Enter key combination

To create a matrix (filled with zeros) use the function **matrix allocate()** and stay in accordance with the following syntax

$$\text{matrix allocate}(2\ ,\ 3) = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

$$\text{matrix allocate}(5\ ,\ 2) = \begin{bmatrix} 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

The first argument determine number of rows, second number of columns

If we want to create a matrix and fill it with some other values we can alternatively use the function **matrix create()** with the following syntax

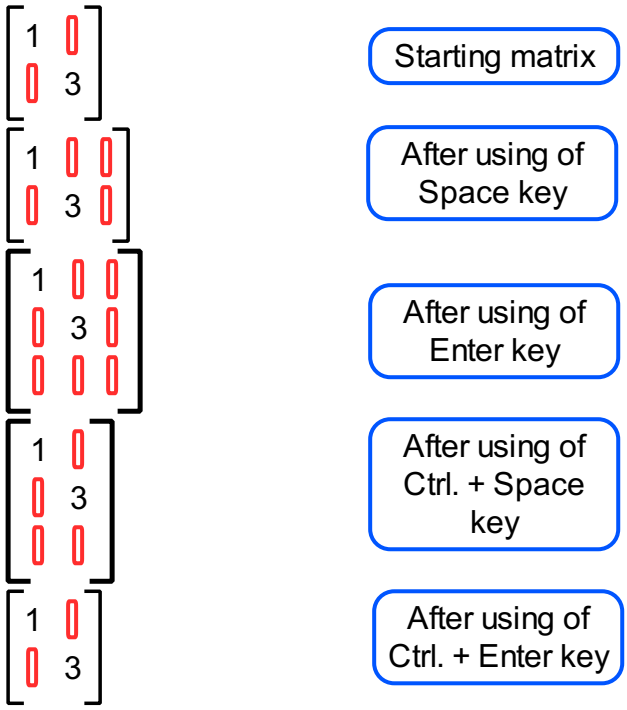
$$\text{matrix create}(2\ ,\ 3\ ,\ -2.3) = \begin{bmatrix} -2.3 & -2.3 & -2.3 \\ -2.3 & -2.3 & -2.3 \end{bmatrix}$$

The third argument determine value to fill matrix with

There is also a function ,**matrix()**, that will create an empty matrix with a dimensions 2x2

Created with matrix() function

While the cursor is in one of the empty fields of a matrix use the Space bar to add one column to the right or use the Enter key to add an additional row bellow. With Ctrl. + Space bar combination while the cursor is in one of the empty fields in the column with the mentioned field will be deleted. With Ctrl. + Enter key combination while the cursor is in one of the empty fields, the row with the mentioned field will be deleted.



To determine the size of a vector or matrix use function, **size()**

$$\text{size}\left(\begin{bmatrix}1 & 2 & 3 & 4 & 5 & 6\end{bmatrix}\right) = 6$$

$$\text{size}\left(\begin{bmatrix}1\\2\\3\end{bmatrix}\right) = 3$$

Function size()

$$\text{size}\left(\begin{bmatrix}1 & 2 & 3\\4 & 5 & 6\\7 & 8 & 9\end{bmatrix}\right) = 9$$

To find out the number of rows and columns in a matrix use the functions, **rows()** and **cols()**

$$\text{rows}\left(\begin{bmatrix}1 & 2\\3 & 4\\5 & 6\end{bmatrix}\right) = 3$$

Functions rows() and cols()

$$\text{cols}\left(\begin{bmatrix}1 & 2\\3 & 4\\5 & 6\end{bmatrix}\right) = 2$$

There is a function that will determine the orientation of a vector, it's name is **is row()**

$$\text{is row}\left(\begin{bmatrix} 1 & 2 & 3 \end{bmatrix}\right) = \text{true}$$

$$\text{is row}\left(\begin{bmatrix} 1 \\ 2 \end{bmatrix}\right) = \text{false}$$

Function is row()

To create an identity matrix use the function, **mat identity()**

$$\text{mat identity}(2, 3) = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$$

$$I_{2\,3} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$$

Identity matrix in textual and visual mode