

CONCLUSION

In a **Cartesian space** the position, velocity and acceleration vectors are:

$$\overrightarrow{OM} = \vec{r} = x\vec{i} + y\vec{j} + z\vec{k} \Rightarrow \vec{v} = v_x\vec{i} + v_y\vec{j} + v_z\vec{k} \Rightarrow \vec{a} = a_x\vec{i} + a_y\vec{j} + a_z\vec{k}$$

$$\vec{r} = \begin{pmatrix} x \\ y \\ z \end{pmatrix}$$

\Rightarrow

$$\vec{v} = \begin{pmatrix} \dot{x} = v_x \\ \dot{y} = v_y \\ \dot{z} = v_z \end{pmatrix}$$

\Rightarrow

$$\vec{a} = \begin{pmatrix} \ddot{x} = \dot{v}_x = a_x \\ \ddot{y} = \dot{v}_y = a_y \\ \ddot{z} = \dot{v}_z = a_z \end{pmatrix}$$