

Goal  
of  
Study  
How  
to  
de-  
scribe  
the  
mo-  
tion  
of  
a  
rigid  
body  
in  
three-  
dimensional  
space?  
rigid  
body  
 $(0, 0, 0)$   
points  
vec-  
tors  
or  
di-  
nates  
a  
co-  
or-  
di-  
nate  
sys-  
tem  
 $R^3$   
base  
 $(\mathbf{e}_1, \mathbf{e}_2, \mathbf{e}_3)$   
a  
co-  
or-  
di-  
nate

$$\mathbf{a} = [\mathbf{e}_1, \mathbf{e}_2, \mathbf{e}_3] \begin{bmatrix} a_1 \\ a_2 \\ a_3 \end{bmatrix} = a_1 \mathbf{e}_1 + a_2 \mathbf{e}_2 + a_3 \mathbf{e}_3.$$

(1)

$$\begin{pmatrix} a_1 \\ a_2 \\ a_3 \end{pmatrix}^T$$

$$\mathbf{x}$$

$$\mathbf{y}$$

$$\mathbf{z}$$

$$\mathbf{x} \times \mathbf{y}$$

$$\mathbf{a}, \mathbf{b} \in R^3_3$$

---

Just  
a  
re-  
minder  
here,  
the  
base  
is  
a  
set  
of  
lin-  
early  
in-  
de-  
pen-  
dent  
vec-  
tors  
in  
the  
space,  
nor-  
mally  
be-  
ing  
or-  
thog-  
nal  
and  
has  
unit-  
length.