Position	$\vec{r} = r_x\vec{\imath} + r_y\vec{\jmath} + r_z\vec{k}$
Instantaneous velocity	$\vec{v} = \frac{d\vec{r}}{dt}, \quad \vec{v} = v_x\vec{\imath} + v_y\vec{\jmath} + v_z\vec{k}$
Instantaneous acceleration	$\vec{a} = \frac{d\vec{v}}{dt}$ $\vec{a} = a_x\,\vec{\imath} + a_y\,\vec{\jmath} + a_z\vec{k}$ Extrinsic components $\vec{a} = a_t\,\vec{\tau} + a_n\,\vec{\eta}$ Intrinsic components
Average velocity	$\vec{v}_a = \frac{\Delta\vec{r}}{\Delta t} = \frac{\vec{r}_F - \vec{r}_I}{t_F - t_I}$
Average acceleration	$\vec{a}_a = \frac{\Delta\vec{v}}{\Delta t} = \frac{\vec{v}_F - \vec{v}_I}{t_F - t_I}$
Tangential and normal acceleration components	$a_t = \frac{d\lvert\vec{v}\rvert}{dt}, \quad a_n = \frac{v^2}{R}$
Total acceleration	$a^2 = a_x^2 + a_y^2 + a_z^2$ Extrinsic components $a^2 = a_t^2 + a_n^2$ Intrinsic components
Unit conversion	**km / h** $\times$ **1000 / 3600** $\rightarrow$ **m/s** **rpm** $\times$ **2π / 60** $\rightarrow$ **rad/s**

Symbol	Magnitude	SI unit
r	Position	m
v	Velocity, Speed	m/s
a	Acceleration (total)	m/s^2
t	Time	s
R	Curvature radius	m
$\vec{\imath}$, $\vec{\jmath}$, $\vec{k}$	Unitary vectors for x, y and z components	
	Intrinsic components of acceleration:	
a_t	Tangential acceleration	m/s^2
a_n	Normal acceleration	m/s^2
$\vec{\tau}$	Unitary vector *tau* for tangential component	
$\vec{\eta}$	Unitary vector *eta* for normal component	
	Extrinsic components of acceleration:	
a_x	x component	m/s^2
a_y	y component	m/s^2
a_z	z component	m/s^2