

Quantity	Arc Length Parametrized	General Curve
Unit Tangent Vector	\vec{v}	$\frac{\vec{v}}{ \vec{v} }$
Curvature	$\left \frac{dT}{ds} \right $	$\frac{1}{ \vec{v} } \left \frac{dT}{dt} \right $ $\frac{ \vec{v} \times \vec{a} }{ \vec{v} ^3}$
Principal Unit Normal Vector	$\frac{1}{\kappa} \frac{dT}{ds}$	$\frac{\frac{dT}{dt}}{\left \frac{dT}{dt} \right }$
Binormal	$T \times N$	$T \times N$
Torsion	$-\frac{dB}{ds} \cdot N$	$\frac{\begin{vmatrix} \dot{x} & \dot{y} & \dot{z} \\ \ddot{x} & \ddot{y} & \ddot{z} \\ \ddot{x} & \ddot{y} & \ddot{z} \end{vmatrix}}{ \vec{v} \times \vec{a} ^2}$
Tangential Component of Acceleration	$\frac{d^2s}{dt^2}$	$\frac{d}{dt} \vec{v} $
Normal Component of Acceleration	$\kappa \left(\frac{ds}{dt} \right)^2$	$\kappa \vec{v} ^2$ $\sqrt{ \vec{a} ^2 - a_T^2}$