



	formula	alternate formulas
Vectors		
velocity	$\vec{v} = \vec{r}'$	$\vec{v} = \ \vec{r}'\ \vec{T}$
acceleration	$\vec{a} = \vec{r}''$	$\vec{a} = a_T \vec{T} + a_N \vec{N}$
unit tangent	$\vec{T} = \frac{\vec{r}'}{\ \vec{r}'\ }$	
unit normal	$\vec{N} = \frac{\vec{T}'}{\ \vec{T}'\ }$	
Scalars		
tangential comp. of acceleration	$a_T = \frac{\vec{r}' \cdot \vec{r}''}{\ \vec{r}'\ }$	$a_T = \vec{a} \cdot \vec{T}$
normal comp. of acceleration	$a_N = \frac{\ \vec{r}' \times \vec{r}''\ }{\ \vec{r}'\ }$	$a_N = \vec{a} \cdot \vec{N}$ $a_N = \ \vec{T}'\ \ \vec{r}'\ $
curvature	$K = \frac{\ \vec{r}' \times \vec{r}''\ }{\ \vec{r}'\ ^3}$	$K = \frac{a_N}{\ \vec{r}'\ ^2}$ $K = \frac{\ \vec{T}'\ }{\ \vec{r}'\ }$
speed	$\ \vec{r}'\ $	$\mathcal{L} = \int_{t_0}^{t_1} \ \vec{r}'\ dt$