

# Properties of $\frac{d\vec{r}}{dt}$

1.  $\frac{d}{dt} [\vec{a}(t) + \vec{b}(t)] = \frac{d}{dt} \vec{a}(t) + \frac{d}{dt} \vec{b}(t)$
2.  $\frac{d}{dt} [\xi \vec{b}(t)] = \xi \vec{b}'(t)$  if  $\xi$  is a constant
3.  $\frac{d}{dt} [\xi(t) \vec{b}(t)] = \xi'(t) \vec{b}(t) + \xi(t) \vec{b}'(t)$
4.  $\frac{d}{dt} [\vec{a}(t) \cdot \vec{b}(t)] = \vec{a}'(t) \cdot \vec{b}(t) + \vec{a}(t) \cdot \vec{b}'(t)$
5.  $\frac{d}{dt} [\vec{a}(t) \times \vec{b}(t)] = \vec{a}'(t) \times \vec{b}(t) + \vec{a}(t) \times \vec{b}'(t)$
6.  $\frac{d}{dt} [\vec{a}(s(t))] = \vec{a}'(s(t)) s'(t)$