

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. $\frac{d}{dt} [\gamma \vec{b}(t)] = \gamma \vec{b}'(t)$ if γ is a constant
3. $\frac{d}{dt} [\gamma(t) \vec{b}(t)] = \gamma'(t) \vec{b}(t) + \gamma(t) \vec{b}'(t)$
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. $\frac{d}{dt} [\vec{a}(s(t))] = \vec{a}'(s(t)) s'(t)$