FORMULAS GOVERNING VECTOR FUNCTIONS

(1) $(\vec{\mathbf{F}} + \vec{\mathbf{G}})(t) = \vec{\mathbf{F}}(t) + \vec{\mathbf{G}}(t)$
(2) $(\vec{\mathbf{F}} - \vec{\mathbf{G}})(t) = \vec{\mathbf{F}}(t) - \vec{\mathbf{G}}(t)$
(3) $(\phi\vec{\mathbf{F}})(t) = \phi(t)\vec{\mathbf{F}}(t)$
(4) $(\vec{\mathbf{F}} \times \vec{\mathbf{G}})(t) = \vec{\mathbf{F}}(t) \times \mathbf{G}(t)$
(5) $(\vec{\mathbf{F}} \cdot \vec{\mathbf{G}})(t) = \vec{\mathbf{F}}(t) \cdot \mathbf{G}(t)$ - Notice that this is a scalar.

Rules of Vector Limits

(1) Limit of a sum or difference

$$lim_{t\to t_0}\left[\vec{\mathbf{F}}(t) \pm \vec{\mathbf{G}}(t)\right] = lim_{t\to t_0}\vec{\mathbf{F}}(t) \pm lim_{t\to t_0}\vec{\mathbf{G}}(t)$$

(2) Limit of a scalar multiple

$$lim_{t\to t_0}\left[\phi(t)\vec{\mathbf{F}}(t)\right] = [lim_{t\to t_0}\phi(t)]\left[lim_{t\to t_0}\vec{\mathbf{F}}(t)\right]$$

(3) Limit of a dot product

$$lim_{t\to t_0}\left[\vec{\mathbf{F}}(t) \cdot \vec{\mathbf{G}}(t)\right] = \left[lim_{t\to t_0}\vec{\mathbf{F}}(t)\right] \cdot \left[lim_{t\to t_0}\vec{\mathbf{G}}(t)\right]$$

(4) Limit of a cross product

$$lim_{t\to t_0}\left[\vec{\mathbf{F}}(t) \times \vec{\mathbf{G}}(t)\right] = \left[lim_{t\to t_0}\vec{\mathbf{F}}(t)\right] \times \left[lim_{t\to t_0}\vec{\mathbf{G}}(t)\right]$$