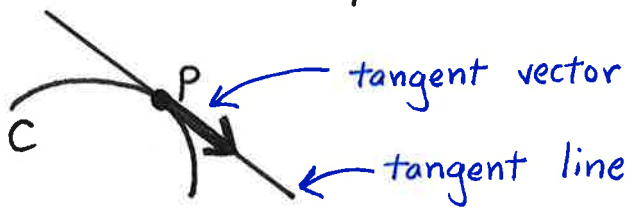
§5:

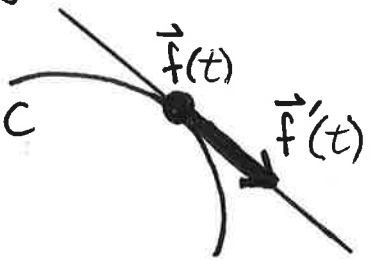
The <u>tangent line</u> of a curve C at a point p is a line that approximates C near p.



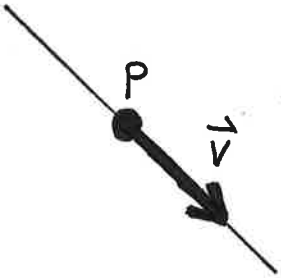
A <u>tangent vector</u> of a curve C at a point p is a vector parallel to the tangent line of C at p.

If C is parametrized by $\vec{f}:\mathbb{R}\to\mathbb{R}^n$, then $\vec{f}'(t)$ is parallel to the tangent line of C at $\vec{f}(t)$.

That is, $\vec{f}'(t)$ is a tangent vector of C at $\vec{f}(t)$.



The (parametric) equation of a line in $\mathbb{R}^3$ containing a point $p=(a,b,c)$ and parallel to a vector $\vec{v}=\langle \ell, m, n\rangle$ is



$$(x,y,z) = t\vec{v}+p$$
$$= (t\ell+a, tm+b, tn+c)$$

The (parametric) equation of the tangent line of a curve at $\vec{f}(a)$ is

$$(x,y,z) = t\vec{f}'(a)+\vec{f}(a).$$