Now, suppose $\bar{\alpha}(t)$ a regular curve.

Build an ordered ONB at $\bar{\alpha}(t)$:

$\{\bar{t}, \bar{n}, \bar{b}\}$

↳ relates to curve itself

curve → surface

$$\{\bar{t},\ N_{\alpha(t)} \times \bar{t},\ N_{\alpha(t)}\}$$

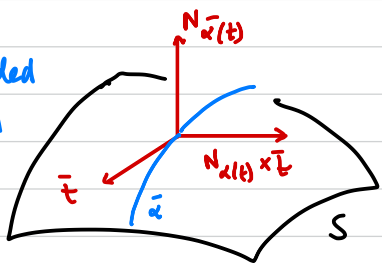
$\{\bar{t}, N \times \bar{t}, \bar{N}\}$

↳ relates to

unit $\dfrac{\bar{\alpha}'(t)}{|\bar{\alpha}'(t)|}$

normal to $T_{\alpha(t)}S$.... we have assumed S oriented.

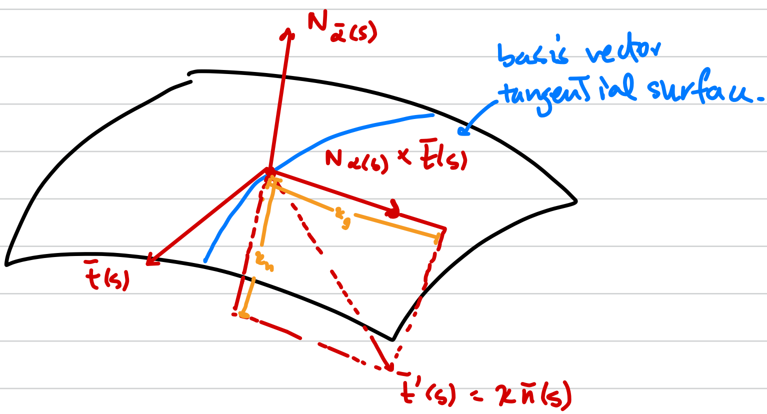
a right-handed system



Given regular $\bar{\alpha}(t)$, to define κ_g:

- reparametrize w.r.t. arc length : $\bar{\alpha}(s)$.
- consider $\bar{t}'(s)$ ⟵ $\bar{t}'(s) \perp \bar{t}(s)$, $\bar{t}'(s) = \kappa \bar{n}(s)$
- $\bar{t}'(s) = \kappa_g (N_{\bar{\alpha}(s)} \times \bar{t}) + \kappa_n (N_{\alpha(s)})$

geodesic curvature. normal curvature



So $\kappa_g = \pm \left| \frac{D\bar{\alpha}'(s)}{ds} \right|$ ± depending on direction rel. to $N_{\alpha(s)} \times \bar{t}(s)$.

p.b.a.l.

Note: by Pythagorean thm: $\kappa^2 = \kappa_n^2 + \kappa_g^2$.

So: given $\bar{t}'(s)$,

$$\kappa_n = \bar{t}'(s) \cdot N_{\bar{\alpha}(s)}$$

$$\kappa_g = \bar{t}'(s) \cdot (N_{\bar{\alpha}(s)} \times \bar{t})$$

If $\bar{\alpha}(s)$ p.b.a.l., κ_g measures side-to-side tangential "wiggling" of trace of $\bar{\alpha}$.