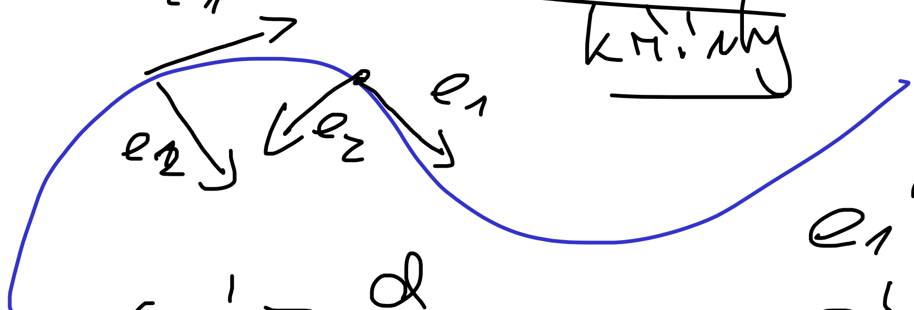
Rovinné křivky $\subseteq \mathbb{R}^2$



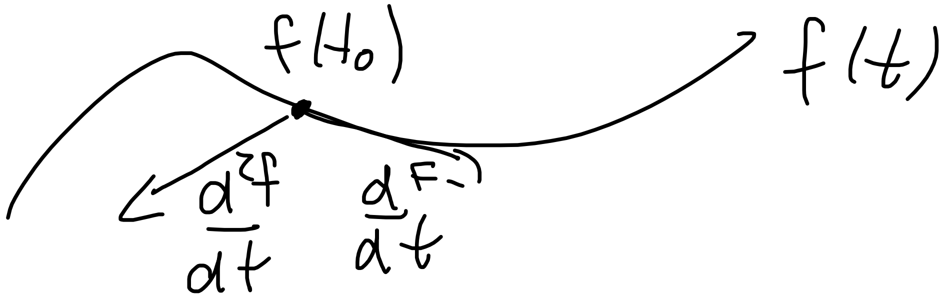
$f(s)$

$$e_1' = \kappa e_2$$

$$e_2' = -\kappa e_1$$

$$(\ )' = \frac{d}{ds}$$

Prostorové křivky $\subseteq \mathbb{R}^3$



Reparametrizace $\quad t=\varphi(\tau)$

$f(\tau)=f(\varphi(\tau))$ nový parametr

Mělo by platit $\underbrace{\left\langle \frac{df}{dt}, \frac{d^2f}{dt^2}\right\rangle}_{=\omega} \overset{?}{=} \left\langle \frac{df}{d\tau}, \frac{d^2f}{d\tau^2}\right\rangle$

$$\frac{df}{d\tau} = \frac{df}{dt}\cdot\frac{d\varphi}{d\tau} \qquad \neq 0$$

$$\frac{d^2f}{d\tau^2} = \left(\frac{d^2f}{dt^2}\cdot\frac{d\varphi}{d\tau}\right)\cdot\frac{d\varphi}{d\tau} + \frac{df}{dt}\cdot\frac{d^2\varphi}{d\tau^2}$$

škálování funkce

$$(a,b,c)\perp \frac{df}{dt} = \left(\frac{df_1}{dt},\frac{df_2}{dt},\frac{df_3}{dt}\right)$$

$$\perp \frac{d^2f}{dt^2}$$

$$\perp \frac{d^3f}{dt^3}$$

$$\frac{de_1}{ds} \perp e_1 \qquad (e_1, e_1) = 1 \Big/ \frac{d}{ds}$$

$$2\left(\frac{de_1}{ds}, e_1\right) = 0$$

$e_1, \frac{de_1}{ds}$ generují ω

$\Rightarrow \frac{de_1}{ds}$ leží na přímce hlavní normály

$$\Phi(s) = x(s)^2 + y(s)^2 - \frac{2}{\kappa(0)} y(s)$$

$$= (s + \alpha(s))^2 + \left(\frac{\kappa(0)}{2} s^2 + \beta(s)\right)^2$$

$$- \frac{2}{\kappa(0)} \left(\frac{\kappa(0)}{2} s^2 + \beta(s)\right) =$$

Stačí ověřit, že $\frac{d^i \Phi(0)}{ds^i} = 0$

pro $i = 0, 1, 2$ • $\Phi(0) = 0$

$$= \cancel{s^2} + 2s\alpha(s) + \alpha(s)^2 + \frac{\kappa(0)^2}{4} s^4 + \kappa(0) s^2 \beta(s)$$

$$+ B(s)^2 - \cancel{s}^2 - \frac{2}{\kappa(0)} B(s)$$

$f(t)$ obecny parametr

$f(\underbrace{t(s)}_{\text{rep.}}) = f(s)$ reparametryzacja na obluk

$$\left\| \frac{df}{ds} \right\| = 1$$

$$\|$$

$$\left\| \frac{df}{dt} \cdot \underbrace{\frac{dt}{ds}}_{>0} \right\| = 1$$

$$\left\| \frac{df}{dt} \right\| \cdot \frac{dt}{ds} = 1$$