TNB COORDINATE SYSTEM

tangent normal binormal

base vectors $(\vec{t}^{\circ}, \vec{n}^{\circ}, \vec{b}^{\circ})$

acceleration vectors

$\vec{a} = \vec{a}_t + \vec{a}_n \qquad (\vec{a}_b = \emptyset)$

external force

$\vec{F} = \vec{F}_t + \vec{F}_n + \vec{F}_b$

Vector equation of dynamic equilibrium

$$\sum_{(i)} \vec{F} + \vec{D} = \vec{\emptyset}$$

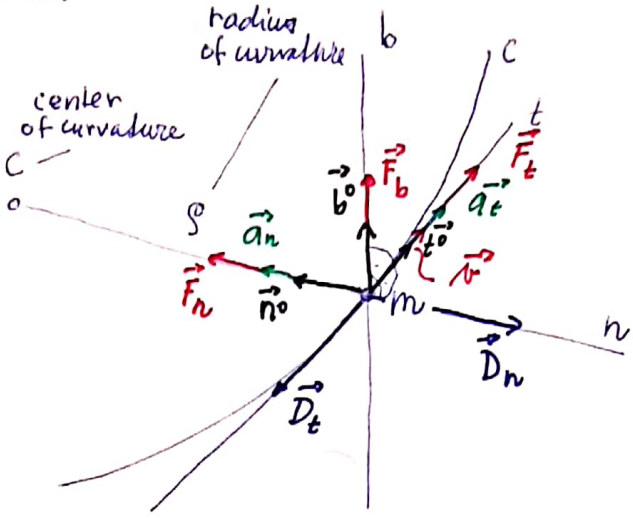
(1) t: $\sum_{(i)} F_{it} - D_t = \emptyset$

(2) n: $\sum_{(i)} F_{in} - D_n = \emptyset$

(3) b: $\sum_{(i)} F_{ib} = \emptyset$

$$a_t = \frac{dv}{dt}$$

$$a_n = \frac{v^2}{\rho}$$



inertia force

$\vec{D} = -m\vec{a} = -m(\vec{a}_t + \vec{a}_n) =$

$= \underbrace{-m\vec{a}_t}_{\vec{D}_t} \quad \underbrace{-m\vec{a}_n}_{\vec{D}_n} = \vec{D}_t + \vec{D}_n$

in binormal direction there is resulting force $\sum F_{ib} = \emptyset$ (no acceleration in binormal direction)