Constant Curvature / Torsion ??

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Curvature of Helix $\gamma(\theta) = (a\cos\theta, a\sin\theta, b\theta)$

$$\kappa = \frac{a}{a^2+b^2} \quad \tau = \frac{b}{a^2+b^2} \quad \longleftrightarrow \quad a = \frac{\kappa}{\kappa^2+\tau^2}, \quad b = \frac{\tau}{\kappa^2+\tau^2}$$

$$\kappa^2+\tau^2 = \frac{1}{a^2+b^2}$$

So the curve w/ constant curvature/torsion is a helix, up to rigid motion (Thm. 2.3)

Ex 20: "General Helix": Tgt. @ fixed angle θ w/ unit vector $\vec{a}$.

$$\tau = \pm\kappa\cot\theta.$$

$\tan\theta = \pm\frac{a}{b}$

General Situation: τ, κ depend on s (arc length)

Involutes / Evolutes

(i) inv. of evol. is parallel curve of γ.
(ii) evol. of invol. is γ

Pursuit Paper

Classical Pursuit: $\dot{P} = s_p \frac{\vec{E}-\vec{P}}{|E-P|} = s_p \frac{\vec{r}}{|\vec{r}|}$

Constant Bearing/CATD: $\Lambda = \langle \frac{\vec{r}}{|\vec{r}|}, R\dot{\vec{x}}_p \rangle = -1 = \cos\theta$ velocity $\vec{x}_p$ makes fixed angle w/ $\vec{r}$,

Motion Camouflage: $\vec{x}_p - \nu\vec{x}_e = G\vec{r}$

$$\left.\vec{x}_p = G\vec{r} + \nu\vec{x}_e\right\} \text{ optimized to reduce } \|\vec{r}\| \text{ as quickly as possible.}$$

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