#4.1. Számítsuk ki a megadott görbék ívhosszát az adott intervallumon!

a) $\boldsymbol{r}(t) = (t)\,\hat{\boldsymbol{\imath}} + (\sqrt{6}t^2/2)\,\hat{\boldsymbol{\jmath}} + (t^3)\,\hat{\boldsymbol{k}}, \quad t \in [0;2]$

b) $\boldsymbol{r}(t) = (t\cos t)\,\hat{\boldsymbol{\imath}} + (t\sin t)\,\hat{\boldsymbol{\jmath}}, \quad t \in [0;1]$

c) $\boldsymbol{r}(t) = (e^t\cos t)\,\hat{\boldsymbol{\imath}} + (e^t\sin t)\,\hat{\boldsymbol{\jmath}} + (e^t)\,\hat{\boldsymbol{k}}, \quad t \in [0;2\pi]$

d) $\boldsymbol{r}(t) = (t - \sin t)\,\hat{\boldsymbol{\imath}} + (1 - \cos t)\,\hat{\boldsymbol{\jmath}}, \quad t \in [0;2\pi]$

---

a) $\boldsymbol{r}(t) = (t)\,\hat{\boldsymbol{\imath}} + (\sqrt{6}t^2/2)\,\hat{\boldsymbol{\jmath}} + (t^3)\,\hat{\boldsymbol{k}}, \quad t \in [0,2]$

$$L = \int_0^2 ||\dot{\boldsymbol{r}}(t)||\,\mathrm{d}t = \int_0^2 \sqrt{1^2 + (\sqrt{6}t)^2 + (3t)^2}\,\mathrm{d}t = \int_0^2 \sqrt{1 + 6t^2 + 9t^4}\,\mathrm{d}t$$

$$= \int_0^2 1 + 3t^2\,\mathrm{d}t = \left[t + t^3\right]_0^2 = 10$$