

Spiraler (1)

Inspireret af artikel:

"Spirals on surfaces of revolution" af Cristian Lazureanu:

<http://elib.mi.sanu.ac.rs/files/journals/vm/57/vmn57p2-10.pdf>

restart

with(plots) :

with(VektorAnalyse4) :

Rotation om z-aksen:

https://en.wikipedia.org/wiki/Rotation_matrix#In_three_dimensions

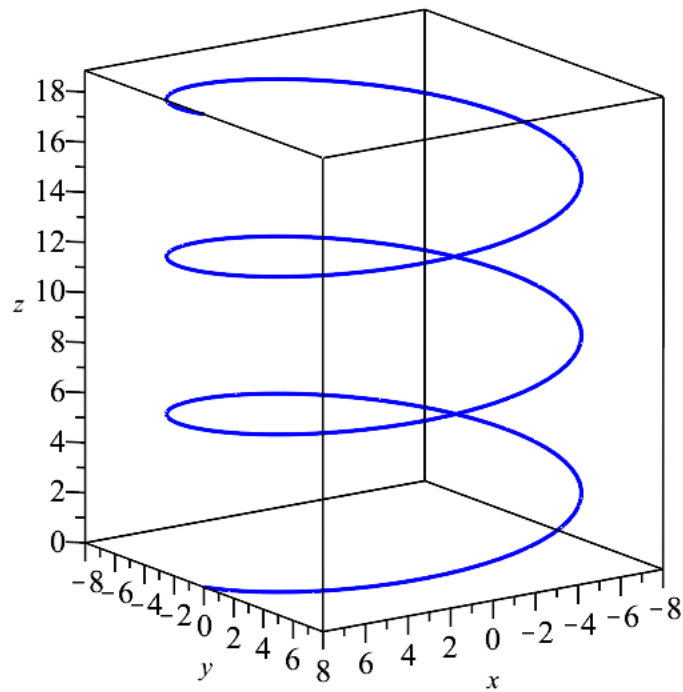
$$R_z(\theta) := \begin{bmatrix} \cos(\theta) & -\sin(\theta) & 0 \\ \sin(\theta) & \cos(\theta) & 0 \\ 0 & 0 & 1 \end{bmatrix} :$$

▼ Cylindrisk helix

$$r_1(t) := R_z(t) \cdot \langle r, 0, c \cdot t \rangle :$$

$$r_1(t) = \begin{bmatrix} \cos(t) r \\ \sin(t) r \\ c t \end{bmatrix}$$

$$R_1 := \text{spacecurve} \left(\left[\text{vop} \left(\text{subs} \left(r = 8, c = 1, r_1(t) \right) \right) \right], t = 0 .. 2 \cdot \pi \cdot 3, \text{color} = \text{blue}, \text{thickness} = 3, \text{labels} = [x, y, z], \text{scaling} = \text{constrained} \right)$$

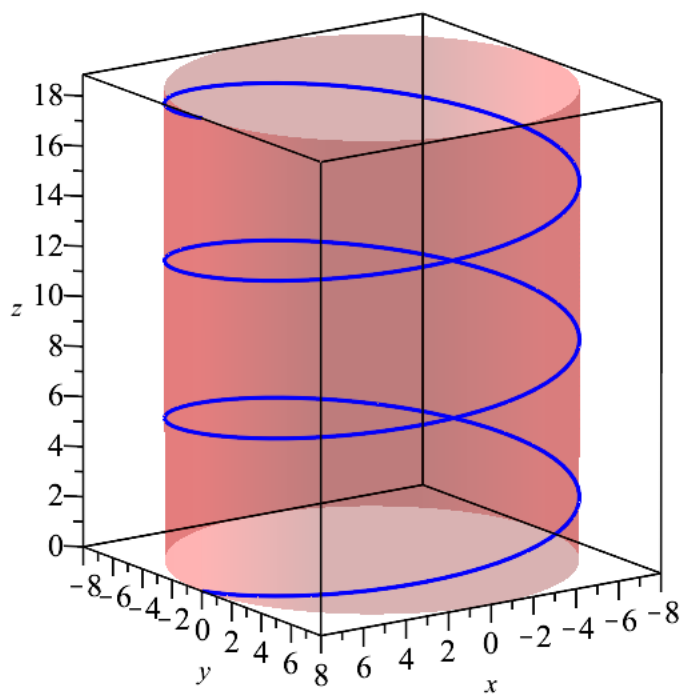


$$r_{cylinder}(u, v) := R_z(v) \cdot \langle r, 0, c \cdot u \rangle :$$

$$r_{cylinder}(u, v) = \begin{bmatrix} \cos(v) r \\ \sin(v) r \\ c u \end{bmatrix}$$

$$R_{cylinder} := \text{plot3d}(\text{subs}(r=8, c=1, r_{cylinder}(u, v)), u=0..2 \cdot \pi \cdot 3, v=0..2 \cdot \pi, \text{color}=\text{red}, \text{transparency}=0.7, \text{labels}=[x, y, z], \text{scaling}=\text{constrained}, \text{numpoints}=10000, \text{style}=\text{patchnograd}) :$$

$$\text{display}(R_1, R_{cylinder})$$

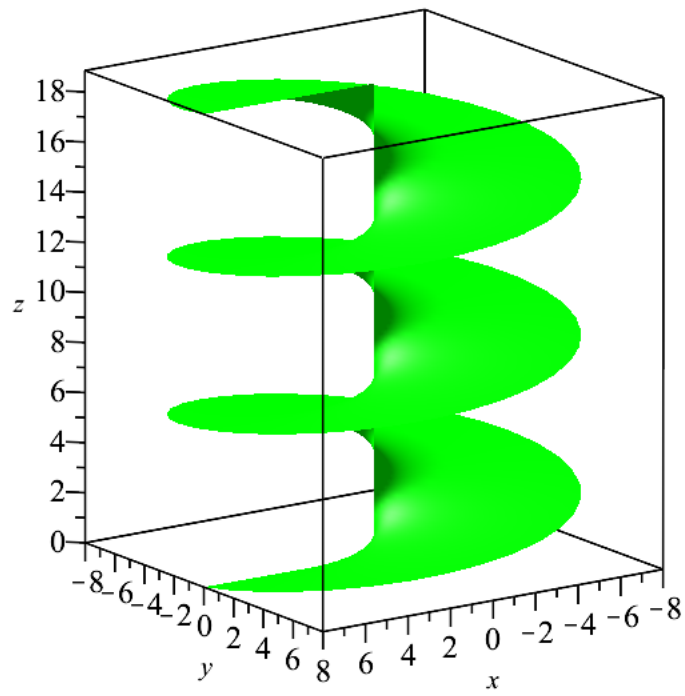


▼ Cylindrisk heliocoide

$$r_2(u, v) := R_z(v) \cdot \langle u \cdot r, 0, c \cdot v \rangle :$$

$$r_2(u, v) = \begin{bmatrix} \cos(v) u r \\ \sin(v) u r \\ c v \end{bmatrix}$$

$R_2 := \text{plot3d}(\text{subs}(r=8, c=1, r_2(u, v)), u=0..1, v=0..2 \cdot \pi \cdot 3, \text{color}=\text{green}, \text{labels}=[x, y, z], \text{scaling} \\ = \text{constrained}, \text{numpoints}=10000, \text{style}=\text{patchnograd})$



$display(R_2, R_{cylinder})$

