

Trefoil Knot*

Parametric formulas for the Trefoil Knot:

$$\begin{aligned}x &= 0.01 (41 \cos(t) - 18 \sin(t) - 83 \cos(2 t) - \\ & 83 \sin(2 t) - 11 \cos(3 t) + 27 \sin(3 t)) \cdot hh \\ y &= 0.01 (36 \cos(t) + 27 \sin(t) - 113 \cos(2 t) + \\ & 30 \sin(2 t) + 11 \cos(3 t) - 27 \sin(3 t)) \cdot hh \\ z &= 0.01 (45 \sin(t) - 30 \cos(2 t) + 113 \sin(2 t) - \\ & 11 \cos(3 t) + 27 \sin(3 t)) \cdot hh\end{aligned}$$

The Trefoil knot, Figure 8 Knot, Granny Knot, Square Knot, displayed by 3D-XplorMath are all harmonic or Fourier knots. That is they are parametrized using finite Fourier series for all three coordinates. The particular parametrizations are taken from the 1995 PhD thesis of Aaron Trautwein at The University of Iowa.

Compare the rotation of the Frenet frame along this trefoil knot (defined with harmonic polynomials) and along the trefoil that results when you select **Torus Knot** with the parameters ($dd=3$, $ee=2$): Near the points on the torus knot where the curvature is very small, the rotation speed of the Frenet frame is large. - The Trefoil Knot can be shown with a Satellite Knot, default $dd = 55$, $ee = 2$.

In stereo mode a Möbius band bounded by the Trefoil Knot is added. Their handedness depends on the sign of hh .
R.S.P.

* This file is from the 3D-XplorMath project. Please see:

<http://3D-XplorMath.org/>