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implicitplot2d()

Метод Драгилева

$$F(X) := \begin{bmatrix} (x \;\; y) \leftarrow (X_0 \;\; X_1) \\ \begin{pmatrix} x^2 - y \cdot x + y^2 - 1 \\ \sin\left(5 \cdot x^2\right) + \sin\left(4 \cdot y^2\right) \end{pmatrix} \end{bmatrix}$$

$$D(t,x) := \text{Draghilev}(F(x), X0, tmin, tmax, N) \rightarrow \begin{bmatrix} 8\cdot\cos\left[4\cdot(x_1)^2\right]\cdot x_1\cdot(x_3)^2 - 8\cdot\cos\left[4\cdot(x_1)^2\right]\cdot x_1\cdot x_3\cdot x_4 + 8\cdot\cos\left[4\cdot(x_1)^2\right]\cdot x_1\cdot(x_4)^2 - 8\cdot\cos\left[4\cdot(x_1)^2\right. \\ 10\cdot\cos\left[5\cdot(x_0)^2\right]\cdot x_0\cdot x_3\cdot x_4 - 10\cdot\cos\left[5\cdot(x_0)^2\right]\cdot x_0\cdot(x_3)^2 - 10\cdot\cos\left[5\cdot(x_0)^2\right]\cdot x_0\cdot(x_4)^2 + 10\cdot\cos\left[5\cdot(x_0)^2\right. \\ 10\cdot\cos\left[5\cdot(x_0)^2\right]\cdot(x_0)^2 - 8\cdot\cos\left[4\cdot(x_1)^2\right]\cdot(x_1)^2 - 20\cdot\text{co} \\ 0 \\ 0 \end{bmatrix}$$

$X0 := \text{stack}(0,1)$ $tmin := 0$ $tmax := 1.6\cdot$ $N := 100$ $ii := 0 .. N - 1$

$result := \text{rkfixed}(\text{stack}(X0, 1, X0), tmin, tmax, N, D)$

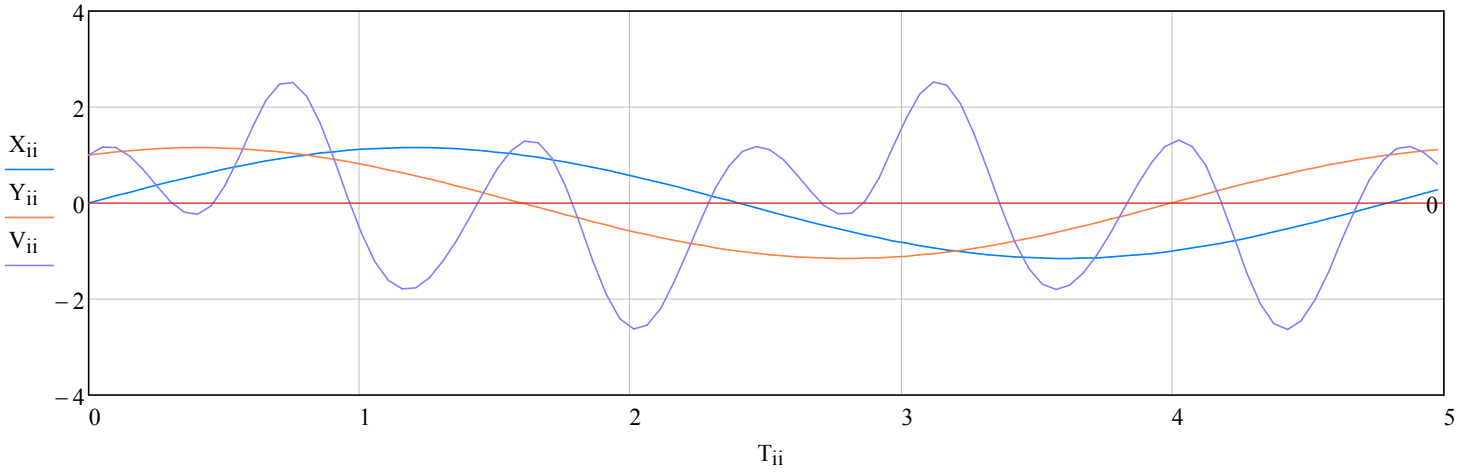
$T := result^{\langle 0 \rangle}$ $X := result^{\langle 1 \rangle}$ $Y := result^{\langle 2 \rangle}$ $V := result^{\langle 3 \rangle}$

$$\text{Roots}(res) := \begin{bmatrix} n \leftarrow \dfrac{\text{cols}(res)}{2} \\ v \leftarrow res^{\langle n \rangle} \\ nv \leftarrow \text{Search}(v) \\ \text{for } ii \in 0 .. \text{length}(nv) - 1 \\ \quad \text{for } jj \in 1 .. n - 1 \\ \quad\quad out_{ii,jj-1} \leftarrow \text{Interpol}\left[\left(res^{\langle jj \rangle}\right)_{(nv_{ii})}, \left(res^{\langle jj \rangle}\right)_{(nv_{ii}+1)}, v_{(nv_{ii})}, v_{(nv_{ii}+1)}\right] \\ out \end{bmatrix}$$

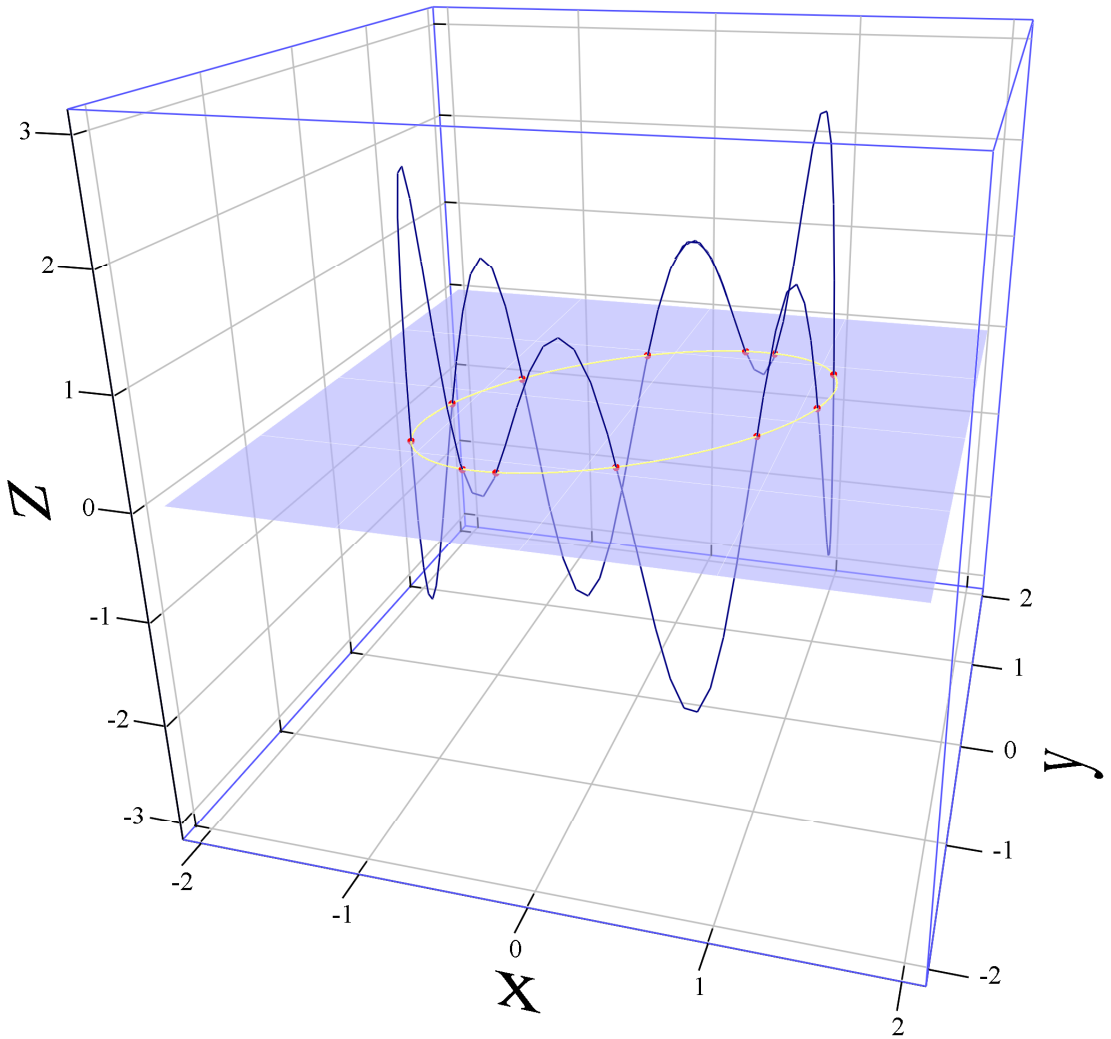
$roots := \text{Roots}(result)$

$roots^T =$

0.455	0.654	1.1	1.099	0.832	0.166	-0.455	-0.653	-1.1	-1.099	-0.831	-0.166
1.146	1.151	0.853	0.244	-0.277	-0.906	-1.146	-1.151	-0.853	-0.244	0.278	0.906



$Curve := (X \quad Y \quad V)^T$ $Plane(x,y) := 0$ $CurveProj := (X \quad Y \quad V \cdot 0)^T$ $RootsPoints := \left(roots^{\langle 0 \rangle} \quad roots^{\langle 1 \rangle} \quad roots^{\langle 0 \rangle} \cdot 0\right)^T$



$xmin := -2 \quad ymin := -2 \quad xmax := 2 \quad ymax := 2$

$$coords := \begin{pmatrix} xmax & ymax \\ xmin & ymin \end{pmatrix}$$

$(nx \quad ny) := (30 \quad 30) \quad grids := (nx \quad ny)^T$

$f(x,y) := F(stack(x,y))_0 \quad S1 := implicitplot2d(f, coords, grids)$

$(nx \quad ny) := (200 \quad 200) \quad grids := (nx \quad ny)^T$

$f(x,y) := F(stack(x,y))_1 \quad S2 := implicitplot2d(f, coords, grids)$