Viacheslav N. Mezentsev, 2007-2012, viacheslavmezentsev@gmail.com

implicitplot2d()

Draghilev's method

$$F(X) := \left| \begin{array}{l} (x \;\; y) \leftarrow (X_0 \;\; X_1) \\ \begin{pmatrix} x^2 + y^2 - 8 \\ \sin(x \cdot y) \cdot \sin(\exp(x \cdot y)) \end{pmatrix} \end{array} \right.$$

$D(t,x) := \text{Draghilev}(F(x)) \rightarrow$

Given $F(\text{stack}(x,y))_0 = 0$ $\text{GetX0}(x,y) := \text{Find}(x,y)$

$X0 := \text{GetX0}(2,-0.5)$ $tmin := 0$ $tmax := 15$ $N := 3500$ $ii := 0 .. N - 1$

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

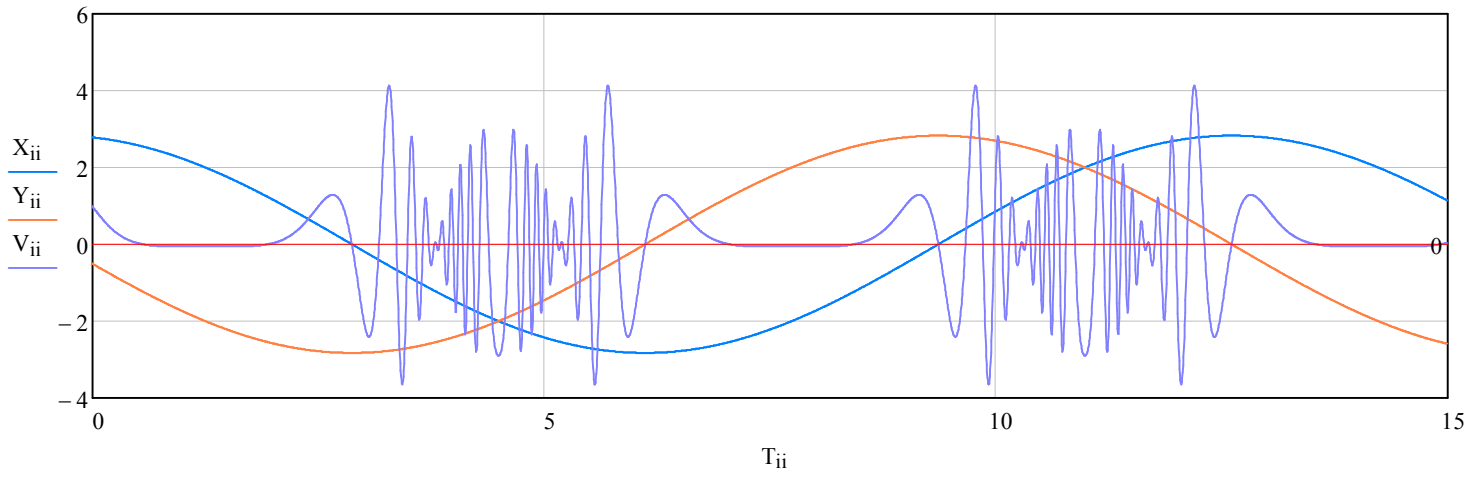
$T := \text{result}^{\langle 0 \rangle}$ $X := \text{result}^{\langle 1 \rangle}$ $Y := \text{result}^{\langle 2 \rangle}$ $V := \text{result}^{\langle 3 \rangle}$

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

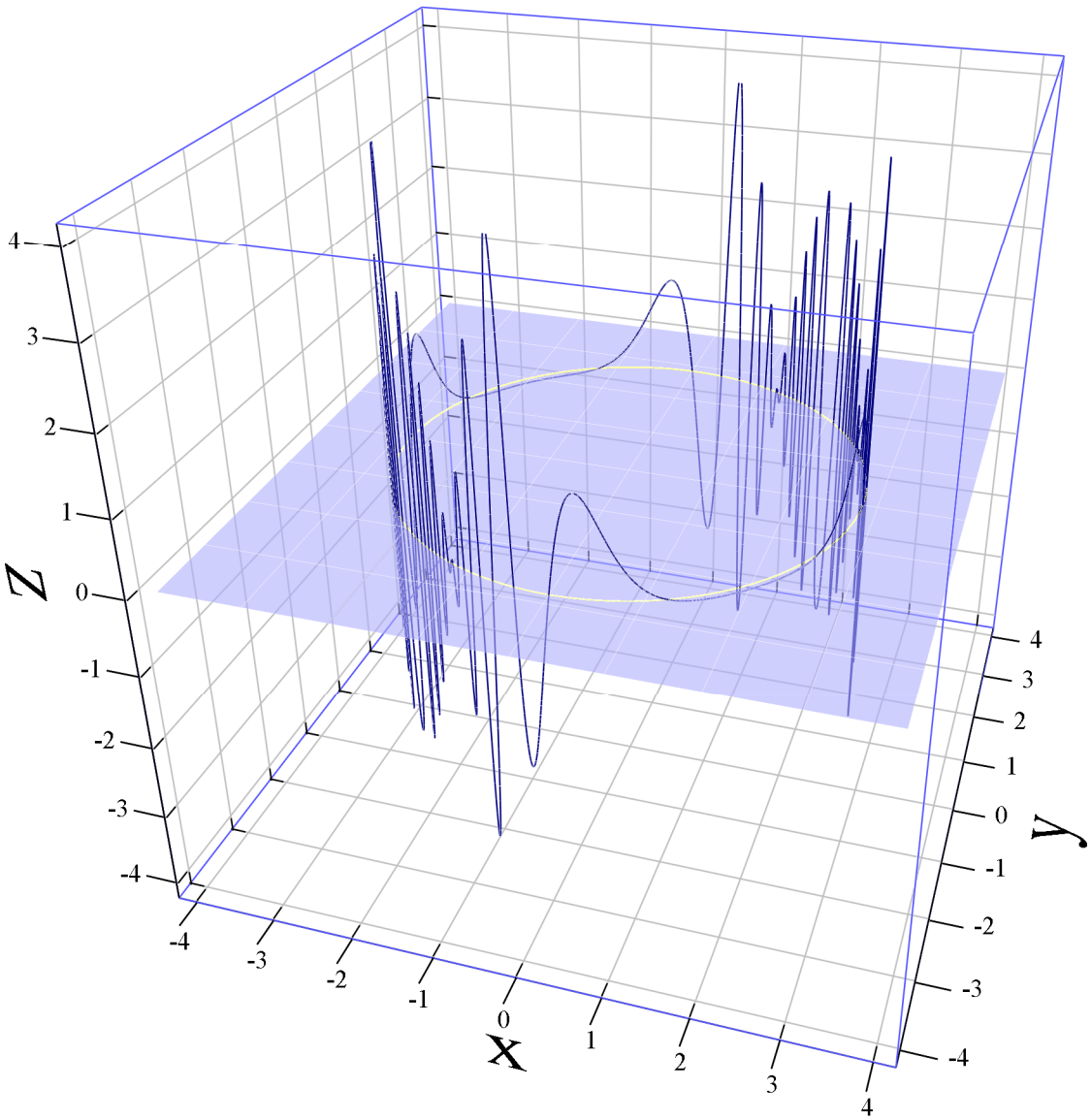
$roots := \text{Roots}(result)$ $\text{rows}(roots) = 82$

$roots^T =$

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
0	2.545	1.235	$\cdot 10^{-5}$	0.409	0.669	-0.83	-0.95	1.048	1.133	1.209	1.234	1.278	1.342	1.404	1.464
1	1.235	2.545	2.828	2.799	2.748	2.704	2.664	2.627	2.592	2.557	2.545	2.523	-2.49	2.455	...



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



$xmin := -4 \quad ymin := -4 \quad xmax := 4 \quad ymax := 4$

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

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

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

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

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