Rolling Curve - Dragilev Method

Dragilev, 2D

$$\Delta := \mathrm{stack}\left(-\frac{d}{d\,y} f(x, y), \frac{d}{d\,x} f(x, y)\right)$$

$$D(t, u) := \left| \mathrm{eval}\left(\frac{\Delta}{\mathrm{norme}(\Delta)}\right)\right.$$

$$MR(\tau, X) := \left| \delta_\tau := (\mathrm{col}(X, 2) + i \cdot \mathrm{col}(X, 3)) \cdot \mathbf{e}^{-2 \cdot \pi \cdot i \cdot T_\tau}\right.$$

$$MO(\tau, k) := \left| \delta_\tau := \mathrm{eval}\left(MR_\tau + k \cdot s \cdot T_\tau - i \cdot \min\left(\mathrm{Im}\left(MR_\tau\right)\right)\right)\right.$$

$$C(n, \tau, MO) := \left| C_{n\,\tau} := \mathrm{eval}\left(\mathrm{stack}\left(\begin{cases}\mathrm{matrix}(0, 1) & \text{if } \tau = 1 \\ C_{n\,\tau-1} & \text{otherwise}\end{cases}, MO_{\tau_{m_n}}\right)\right)\right.$$

$$Plot(t, MO, C, H) := \left| \begin{cases} \mathrm{augment}\left(\mathrm{Re}\left(MO_t\right), \mathrm{Im}\left(MO_t\right) + H\right) \\ \mathrm{mat2sys}_1\left(\delta_n := \mathrm{augment}\left(\mathrm{Re}\left(C_{n\,t}\right), \mathrm{Im}\left(C_{n\,t}\right) + H\right)\right) \\ \mathrm{mat2sys}_1\left(\delta_n := \mathrm{augment}\left(\mathrm{Re}\left(MO_{t_{m_n}}\right), \mathrm{Im}\left(MO_{t_{m_n}}\right) + H, \text{"o"}\right)\right) \end{cases}\right.$$

$$RK(s, N) := \left| \mathrm{dn\_AdamsMoulton}(Xo, 0, s, N-1, D)\right.$$

$$\varphi(u) := \left| \begin{array}{l} U := RK(u, N) \\ \mathrm{stack}\left(U_{N\,2} - U_{1\,2}, U_{N\,3} - U_{1\,3}\right) \end{array}\right.$$

$$n := [1..3] \qquad n := [1..5]$$

$$m := \frac{9-n}{8} \cdot N$$

$$\nu := 60 \quad \text{Frames} \qquad \tau := [1..\nu] \qquad T_\tau := 2 \cdot \frac{\tau - 1}{\nu - 1}$$

Example

Example

$$f(x, y) := 2 \cdot x^2 + y^4 - 2$$

$$Xo := \mathrm{stack}(0, \mathrm{roots}(f(0, y), y, 1))$$

$$\mathrm{Clear}(x, y, t) = 1$$

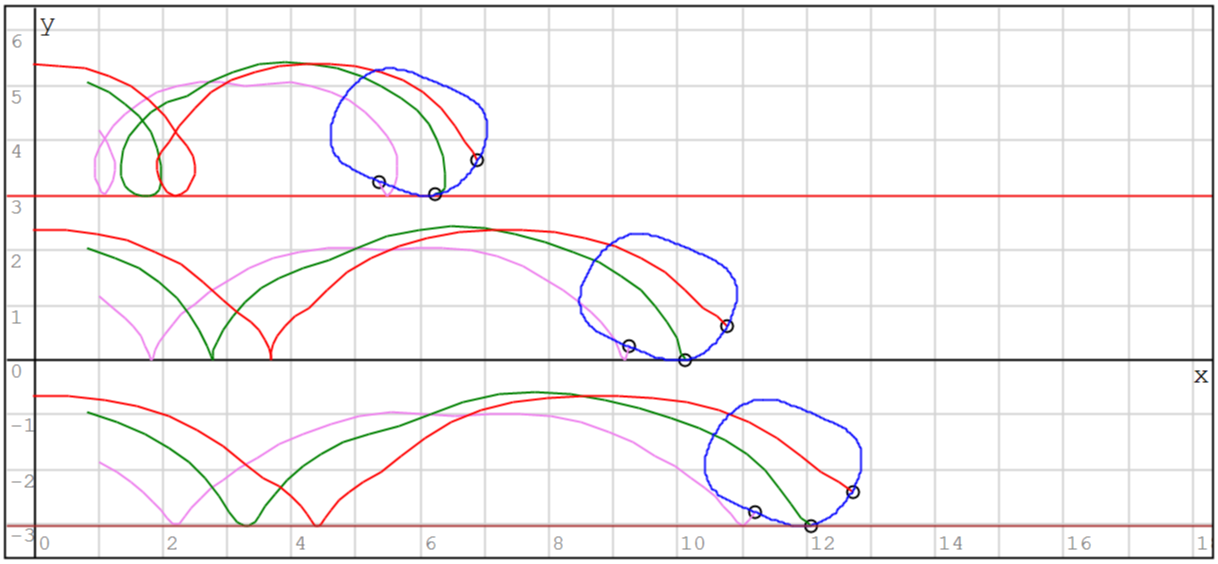
$$N := 200 \qquad s := 7.3$$

$$[x\ y] := [u_1\ u_2] \qquad [s] := \mathrm{al\_nleqsolve}(s, \varphi) = [7.3375] \qquad MR := MR(\tau, RK(s, N))$$

$$k_1 := 0.6 \qquad MO_1 := MO(\tau, k_1) \qquad C_1 := C(n, \tau, MO_1)$$

$$k_2 := 1 \qquad MO_2 := MO(\tau, k_2) \qquad C_2 := C(n, \tau, MO_2)$$

$$k_3 := 1.2 \qquad MO_3 := MO(\tau, k_3) \qquad C_3 := C(n, \tau, MO_3)$$



With sliding: $0 \le k < 1$

Without sliding: $k = 1$

With pushing: $k > 1$

Example

Example

$f(x, y) := 2 \cdot x^2 + 3 \cdot x \cdot \sin(x \cdot y) + y^4 - 2$

$Clear(x, y, t) = 1$

$Xo := stack(0, roots(f(0, y), y, 1))$

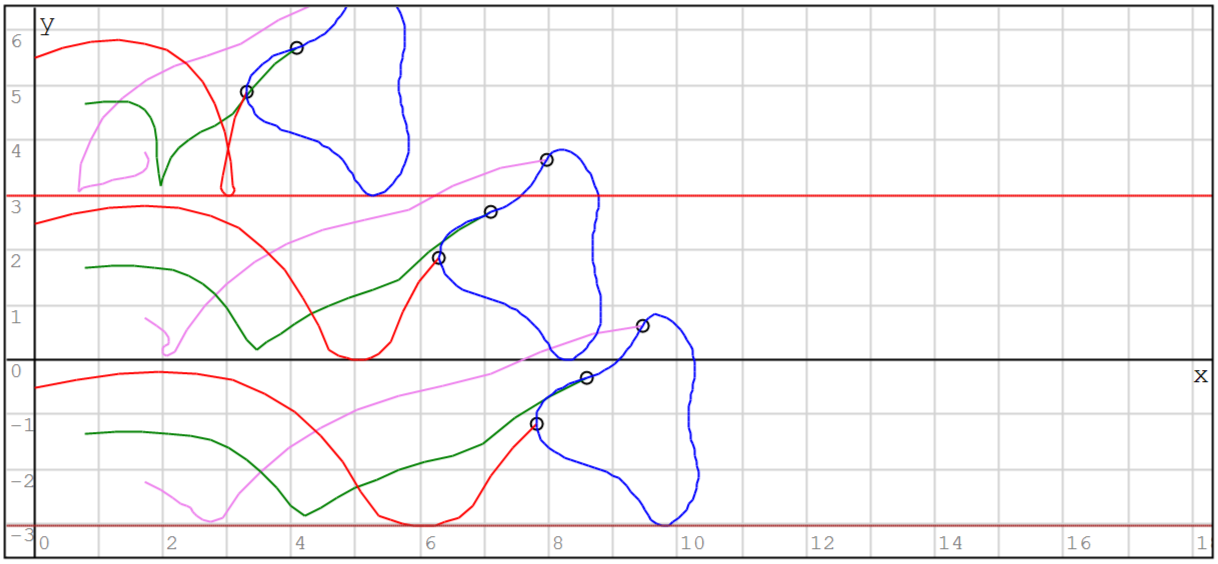
$N := 100$ $s := 10$

$[x\ y] := [u_1\ u_2]$ $[s] := al\_nleqsolve(s, \varphi) = [10.0445]$ $MR := MR(\tau, RK(s, N))$

$k_1 := 0.6$ $MO_1 := MO(\tau, k_1)$ $C_1 := C(n, \tau, MO_1)$

$k_2 := 1$ $MO_2 := MO(\tau, k_2)$ $C_2 := C(n, \tau, MO_2)$

$k_3 := 1.2$ $MO_3 := MO(\tau, k_3)$ $C_3 := C(n, \tau, MO_3)$



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