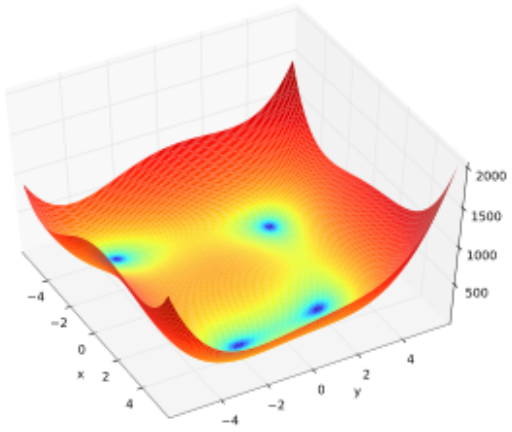
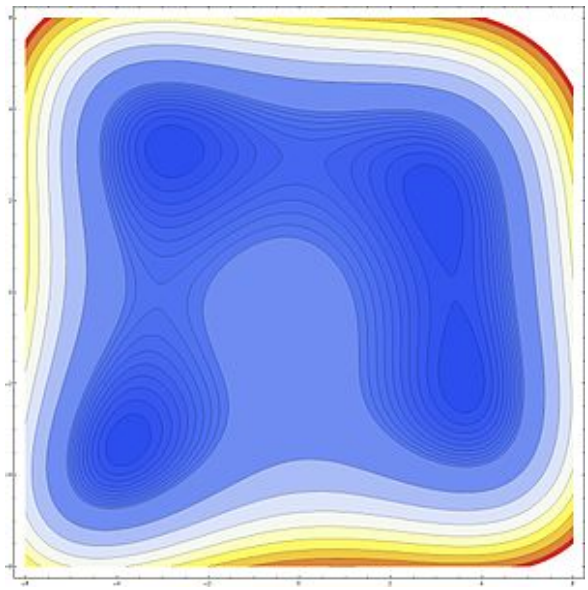
Draghilev's method. Examples. Viacheslav N. Mezentsev, viacheslavmezentsev@ya.ru

Draghilev's method

Himmelblau's function: http://en.wikipedia.org/wiki/Himmelblau%27s_function
In mathematical optimization, the Himmelblau's function is a multi-modal function, used to test the performance of optimization algorithms.

$$f(x,y) := \left(x^2 + y - 11\right)^2 + \left(x + y^2 - 7\right)^2$$





Let's find all the extremes of the Himmelblau's function.

$$f1(x,y) := \frac{d}{dx} f(x,y) \qquad f1(x,y) = 2\cdot\left(-7 + x + y^2 + 2\cdot x\cdot\left(-11 + y + x^2\right)\right)$$

$$f2(x,y) := \frac{d}{dy} f(x,y) \qquad f2(x,y) = 2\cdot\left(-11 + y\cdot\left(1 + 2\cdot\left(-7 + x + y^2\right)\right) + x^2\right)$$

$$F(X) := \left\| \begin{bmatrix} x := X_1 & y := X_2 \end{bmatrix} \right\| \begin{bmatrix} f1(x,y) \\ f2(x,y) \end{bmatrix}$$

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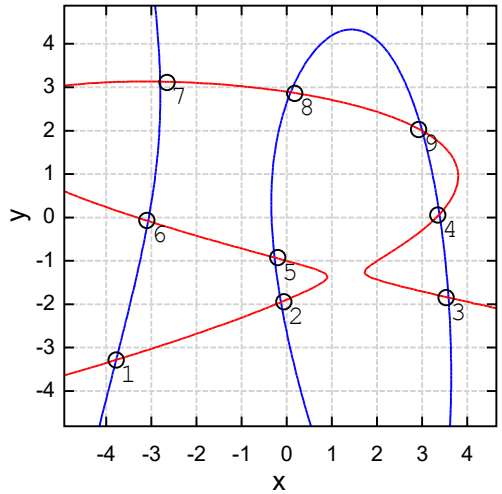
$X_0 := \text{stack}(-5.56, -4.05)$ $t_{min} := 0$ $t_{max} := -0.0045$ $N := 100$

$result := Draghilev\left(F(X), X_0, t_{min}, t_{max}, N\right)$ $k := \text{rows}(result)$ $k = 9$

$XY := result_{[1..k][1..2]}$

for $m \in [1..k]$ for $m \in [1..k]$
$o\_O_m := \text{"o"}$ $o\_\#_m := \text{num2str}(m)$



$$XY = \begin{bmatrix} -3.7785 & -3.283 \\ -0.0633 & -1.9423 \\ 3.5317 & -1.8492 \\ 3.3475 & 0.0585 \\ -0.1982 & -0.9244 \\ -3.0982 & -0.0658 \\ -2.6545 & 3.1136 \\ 0.1772 & 2.858 \\ 2.9243 & 2.029 \end{bmatrix}$$