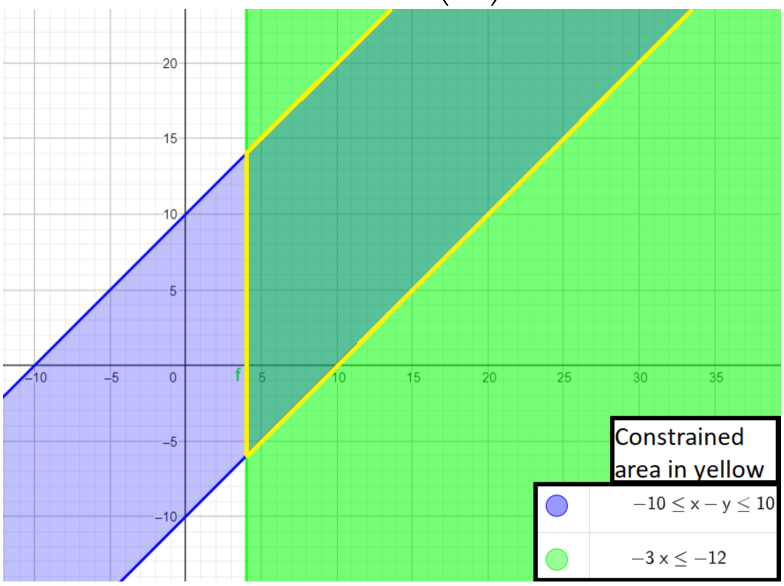
e04mt

(test n1)

$$c = \begin{pmatrix} 1 \\ 3 \\ -2 \end{pmatrix}, l_x = \begin{pmatrix} -5 \\ -5 \\ 0 \end{pmatrix}, u_x = \begin{pmatrix} 15 \\ 2 \\ 0 \end{pmatrix}$$

$$A = \begin{pmatrix} 1 & -1 & 0 \\ -3 & 0 & 10 \end{pmatrix}, l_A = \begin{pmatrix} -10 \\ -\infty \end{pmatrix}, u_A = \begin{pmatrix} 10 \\ -12 \end{pmatrix}$$

$$min(c^T x_{min}) = -11, \quad x_{min} = \begin{pmatrix} 4 \\ -5 \\ 0 \end{pmatrix}$$



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(test n2)

$$c = \begin{pmatrix} -2 \\ 4 \\ 7 \end{pmatrix}, l_x = \begin{pmatrix} -3 \\ -5 \\ 0 \end{pmatrix}, u_x = \begin{pmatrix} 6 \\ 5 \\ +\infty \end{pmatrix}$$

$$A = \begin{pmatrix} 1 & 1 & 1 \\ 3 & 2 & 1 \\ 0 & -4 & 7 \end{pmatrix}, l_A = \begin{pmatrix} -12 \\ -\infty \\ -25 \end{pmatrix}, u_A = \begin{pmatrix} +\infty \\ 0 \\ 10 \end{pmatrix}$$

$$min(c^T x_{min}) = -\frac{80}{3}, \quad x_{min} = \begin{pmatrix} -\frac{10}{3} \\ -5 \\ 0 \end{pmatrix}$$

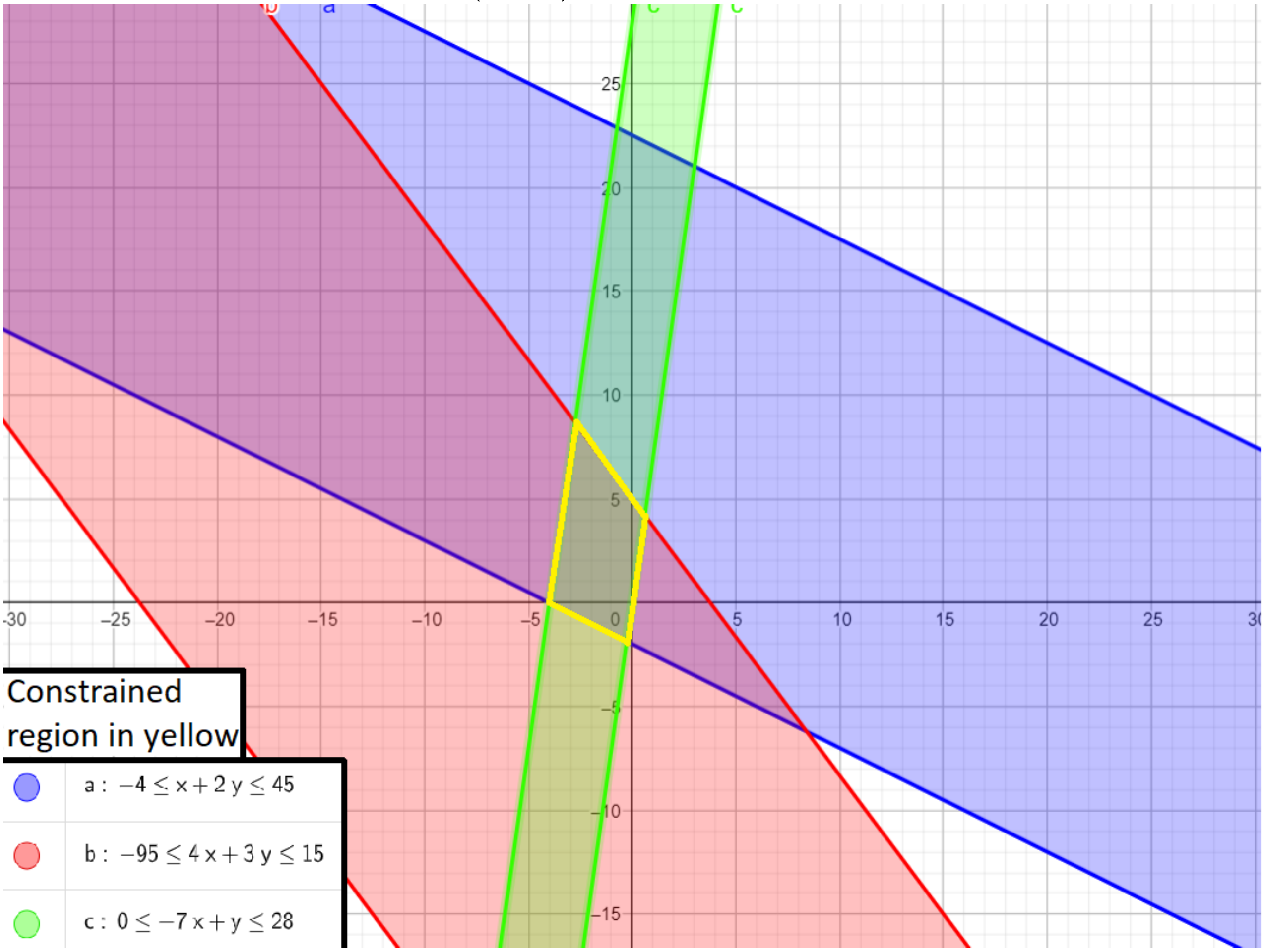
Depiction is hardly possible for $\mathbb{R}^3 \to \mathbb{R}$ functions

(test n3)

$$c = \begin{pmatrix} 1 \\ -1 \end{pmatrix}, l_x = \begin{pmatrix} -50 \\ -45 \end{pmatrix}, u_x = \begin{pmatrix} 100 \\ 80 \end{pmatrix}$$

$$A = \begin{pmatrix} 1 & 2 \\ 4 & 3 \\ -7 & 1 \\ 0 & 0 \end{pmatrix}, l_A = \begin{pmatrix} -4 \\ -95 \\ 0 \\ -20 \end{pmatrix}, u_A = \begin{pmatrix} 45 \\ 15 \\ 28 \\ 1 \end{pmatrix}$$

$$min(c^T x_{min}) = -11.44, \quad x_{min} = \begin{pmatrix} -2.76 \\ 8.68 \end{pmatrix}$$



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e04kf

Matyas function $\mathbb{R}^2 \to \mathbb{R}$,
$f(x) = 0.26(x_1^2 + x_2^2) - 0.48 * x_1 * x_2$

$l_x = \begin{pmatrix} -10 \\ -5 \end{pmatrix}$, $u_x = \begin{pmatrix} 10 \\ 3.5 \end{pmatrix}$

$min(f(x_{min})) = 0, \quad x_{min} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$

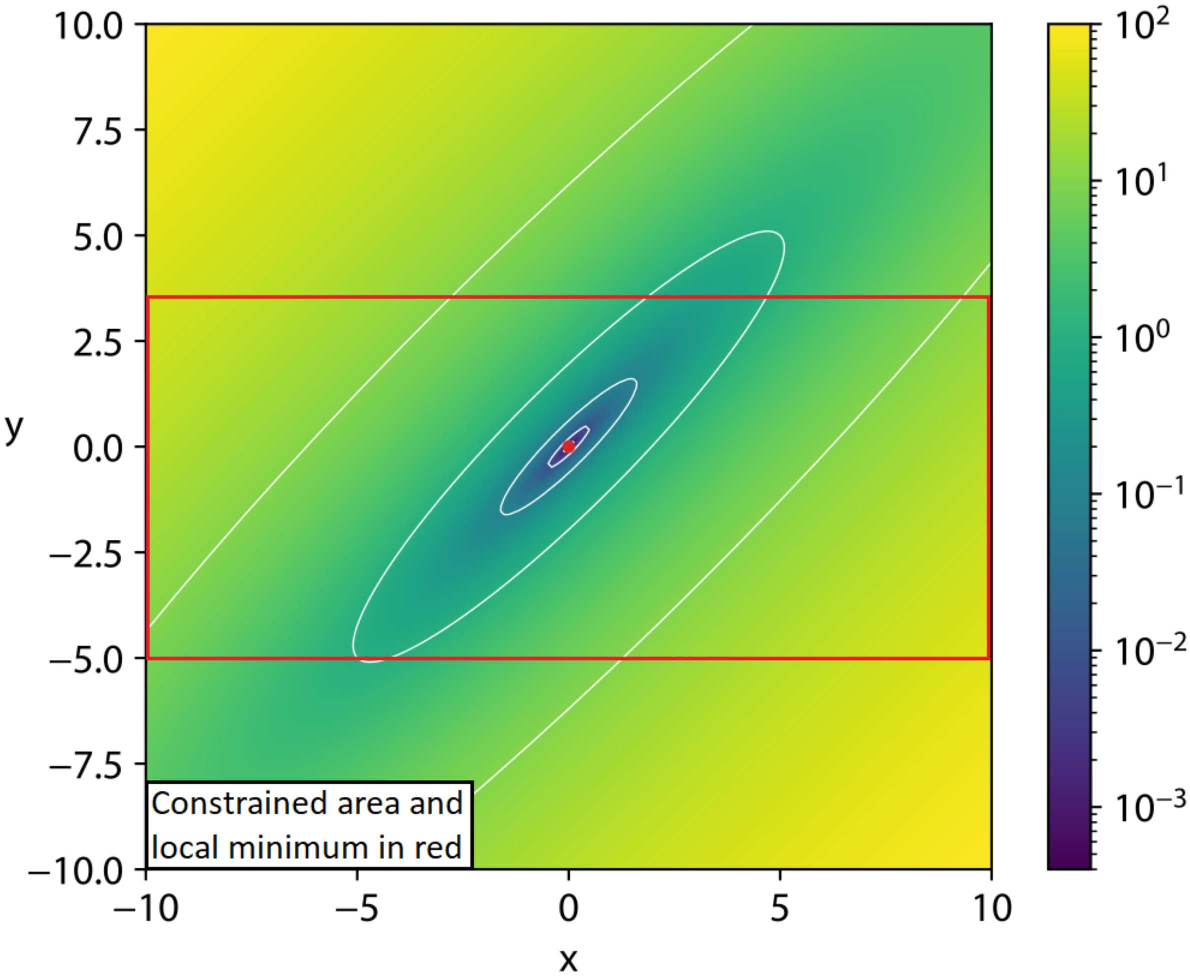


image source: https://en.wikipedia.org/wiki/Test_functions_for_optimization

Easom function $\mathbb{R}^2 \to \mathbb{R}$,
$f(x) = -\cos(x_1)\cos(x_2)\exp(-((x_1 - \pi)^2 + (x_2 - \pi)^2))$

$l_x = \begin{pmatrix} -1 \\ -1 \end{pmatrix}$, $u_x = \begin{pmatrix} \frac{3}{4}\pi \\ 6 \end{pmatrix}$

$min(f(x_{min})) = -0.3815841540302878366, \quad x_{min} = \begin{pmatrix} \frac{3}{4}\pi \\ \pi \end{pmatrix}$

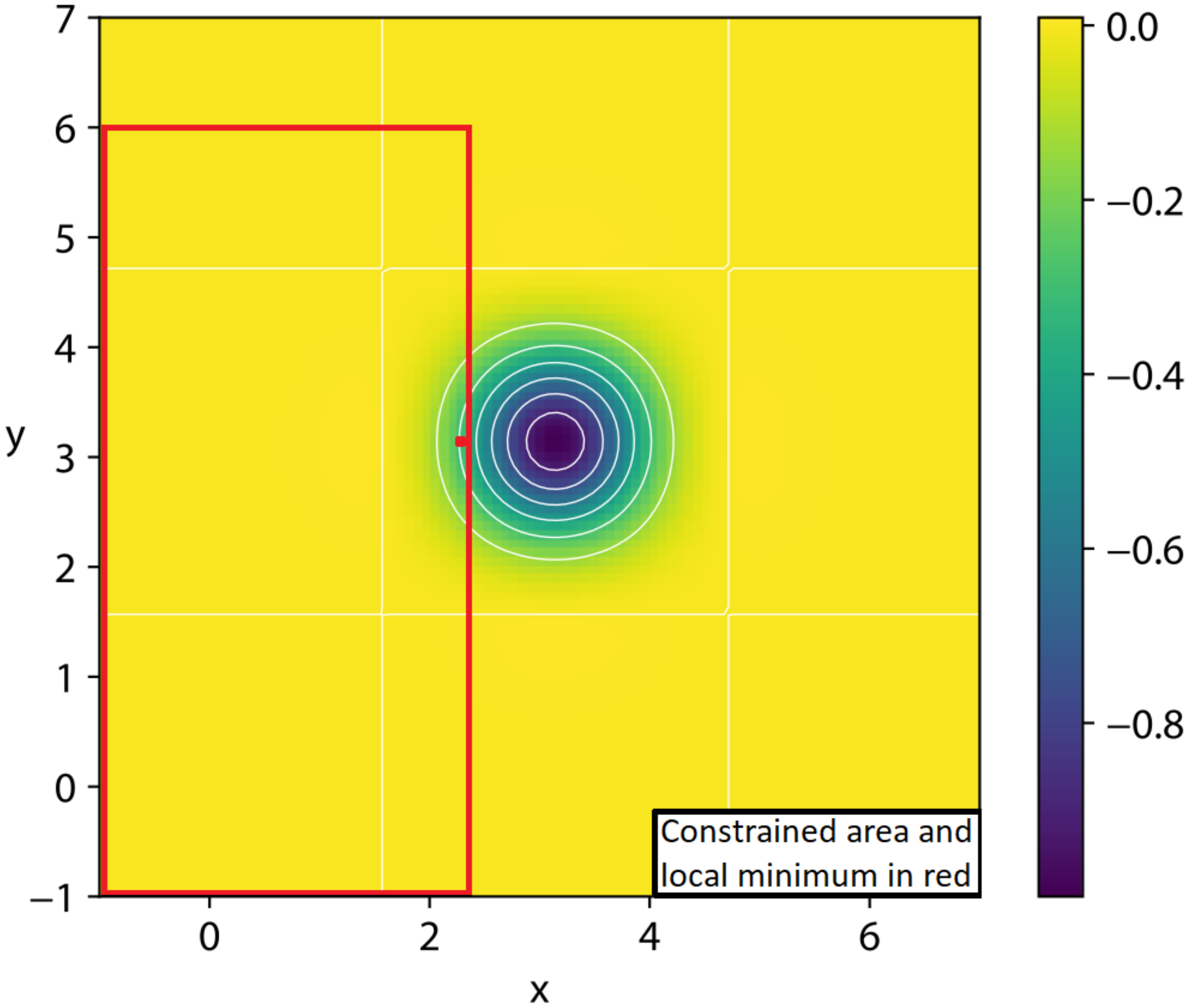


image source: https://en.wikipedia.org/wiki/Test_functions_for_optimization

3d Zakharov function $\mathbb{R}^3 \rightarrow \mathbb{R}$,

$f(x) = x_1^2 + x_2^2 + x_3^2 + (0.5 * x_1 + x_2 + 1.5 * x_3)^2 + (0.5 * x_1 + x_2 + 1.5 * x_3)^4$

$$l_x = \begin{pmatrix} -5 \\ -5 \\ -5 \end{pmatrix}, u_x = \begin{pmatrix} 10 \\ 10 \\ 10 \end{pmatrix}$$

$$min(f(x_{min})) = 0, \quad x_{min} = \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix}$$

Depiction of $\mathbb{R}^2 \to \mathbb{R}$ Zakharov

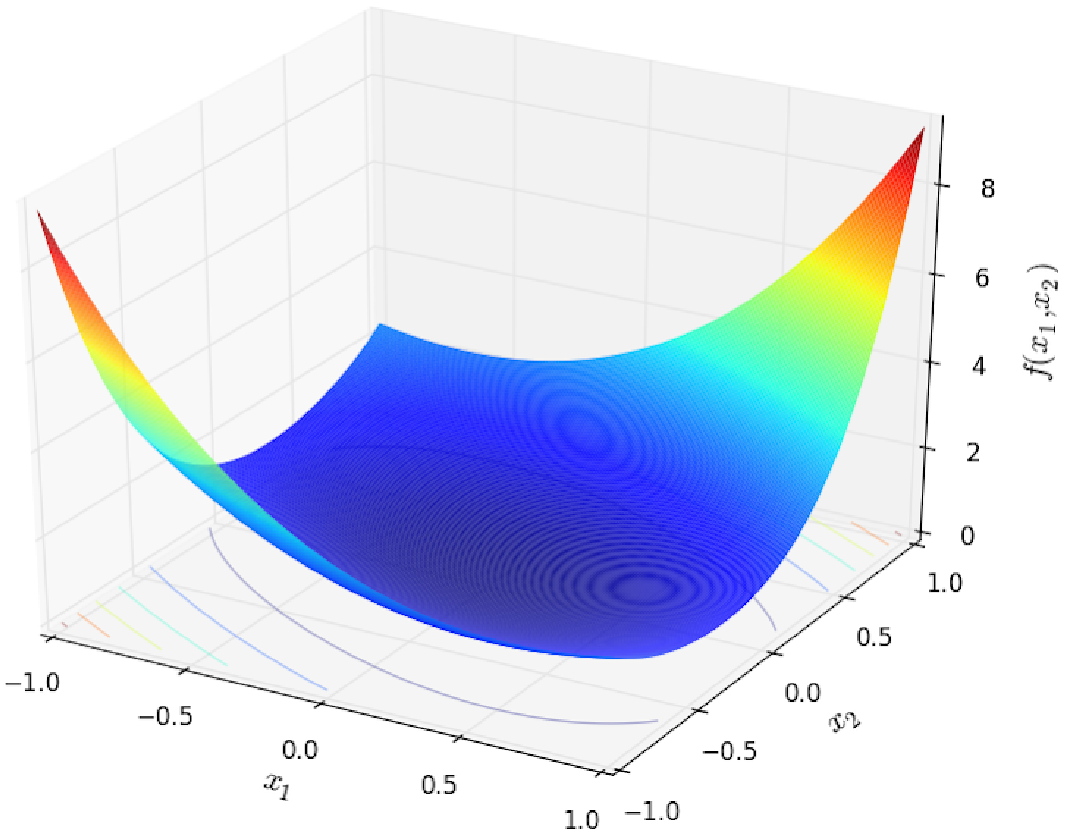


image source: https://sites.google.com/site/gotestfunctions/multimodal-function-list/function-21-zakharov

e04st

Rosenbrock on disk f(x)= $(1-x_1)^2 + 100*(x_2-x_1^2)^2$
$g(x) = x_1^2 + x_2^2$, $l_g = -\infty, u_g = 2$
$B = 0, l_B = 0$, $u_B = 0$
$l_x = \begin{pmatrix} -1.5 \\ -1.5 \end{pmatrix}, u_x = \begin{pmatrix} 1.5 \\ 1.5 \end{pmatrix}$
$min(f(x_{min})) = 0, \quad x_{min} = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$

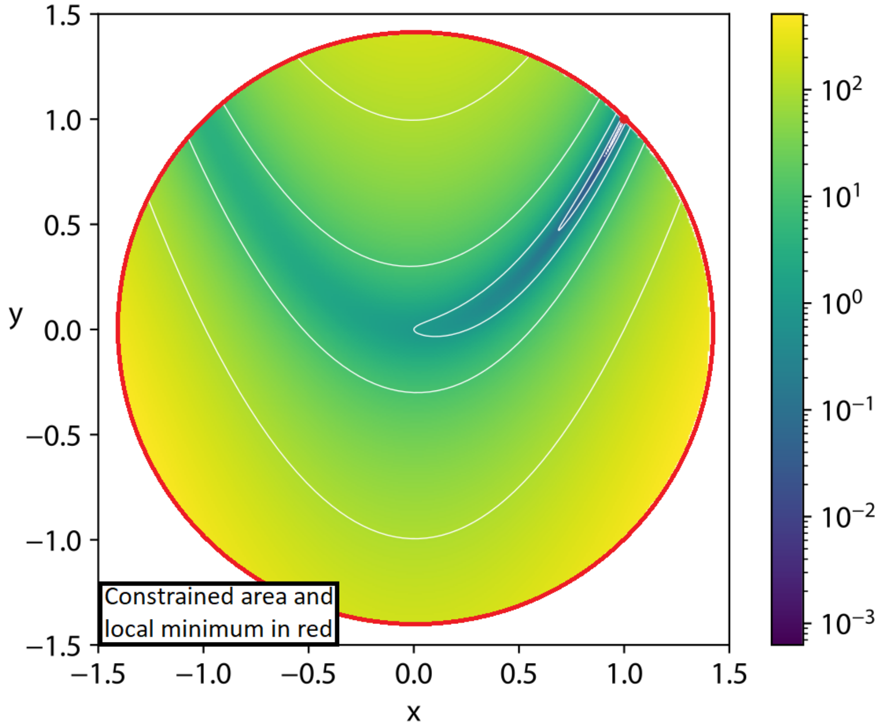


image source: https://en.wikipedia.org/wiki/Test_functions_for_optimization

Rosenbrock constrained f(x)= $(1-x_1)^2 + 100*(y-x^2)^2$
$g(x) = 0$, $l_g = 0, u_g = 0$
$B = \begin{pmatrix} 1 & 1 \\ -1 & 1 \end{pmatrix}, l_B = \begin{pmatrix} -1 \\ -0.5 \end{pmatrix}, u_B = \begin{pmatrix} 3 \\ 1.5 \end{pmatrix}$
$l_x = \begin{pmatrix} -1.5 \\ -1.5 \end{pmatrix}, u_x = \begin{pmatrix} 2.5 \\ 2.5 \end{pmatrix}$
$min(f(x_{min})) = 0, \quad x_{min} = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$

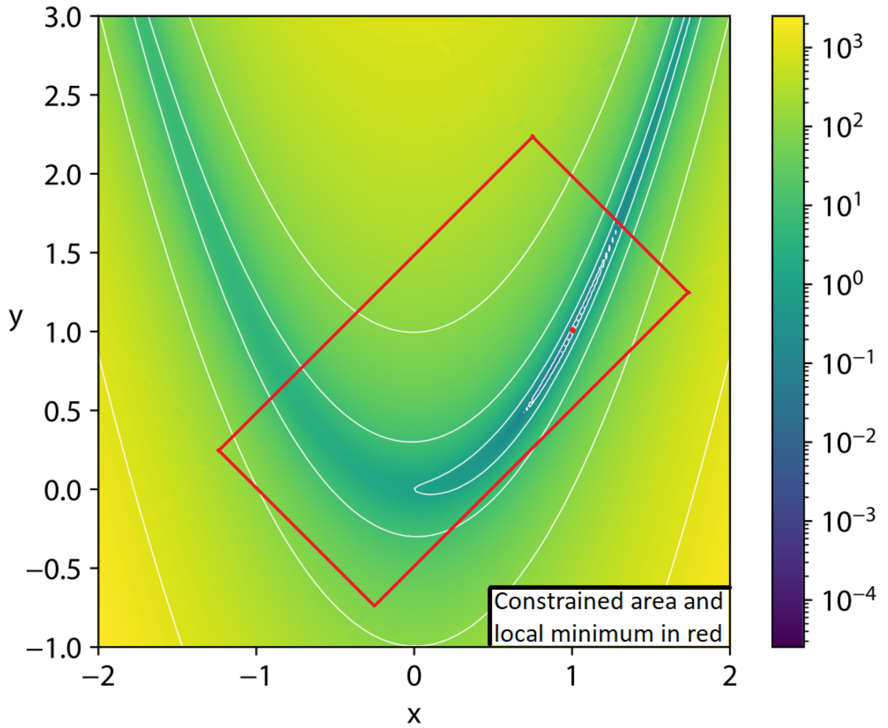
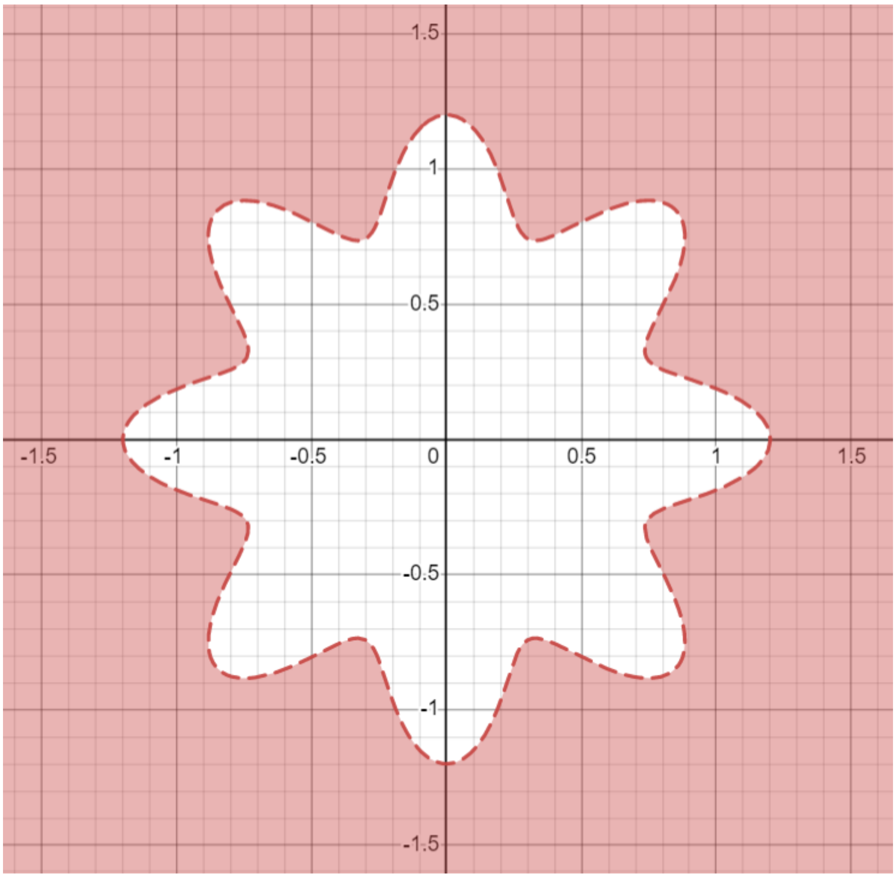


image source: https://en.wikipedia.org/wiki/Test_functions_for_optimization

2d Zakharov (modified) $f(x) = x_1^2 + x_2^2 + (0.5 * x_1 + x_2)^2 + (0.5 * x_1 + x_2)^4$
$g(x) = x_1^2 + x_2^2 - (1 + 0.2 * cos(8 * arctan(\frac{x}{y})))^2$
$l_g = -\infty, u_g = 0$
$B = 0, l_B = 0,\ u_B = 0$
$l_x = \begin{pmatrix} -5 \\ -5 \end{pmatrix},\ u_x = \begin{pmatrix} 10 \\ 10 \end{pmatrix}$
$min(f(x_{min})) = 0, \quad x_{min} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$
Constrained area for two-dimensional Zakharov in white



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