

COMPUTO EVOLUTIVO

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1. INSTRUCCIONES

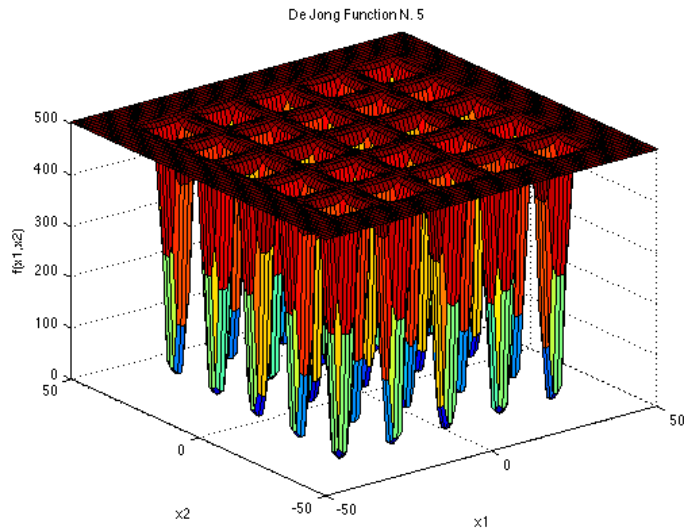
Considere los siguientes problemas de Optimización Mono-Objetivo sin restricciones. Encuentre la mejor solución de las funciones presentadas realizado al menos 10 ejecuciones de la misma, con al menos 10000 generaciones.

(1) *Minimizar*

$$f(\mathbf{x}) = \left(0.002 + \sum_{i=1}^{25} \frac{1}{i + (x_1 - a_{1i})^6 + (x_2 - a_{2i})^6} \right)^{-1}, \text{ where}$$

$$\mathbf{a} = \begin{pmatrix} -32 & -16 & 0 & 16 & 32 & -32 & \dots & 9 & 16 & 32 \\ -32 & -32 & -32 & -32 & -32 & -16 & \dots & 32 & 32 & 32 \end{pmatrix}$$

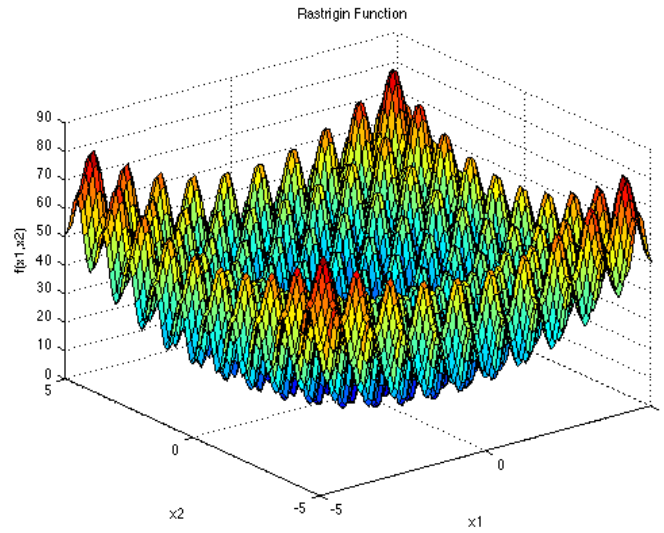
En el intervalo $x_i \in [-65.536, 65.536]$, para todo $i = 1, 2$.



(2) *Minimizar*

$$f(\mathbf{x}) = 10d + \sum_{i=1}^d [x_i^2 - 10 \cos(2\pi x_i)]$$

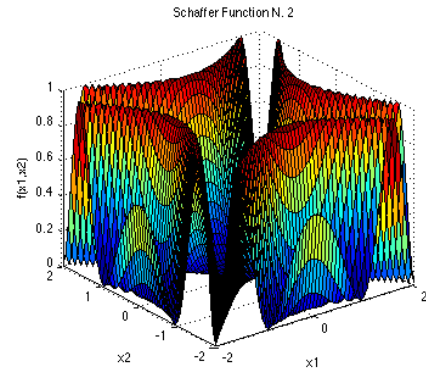
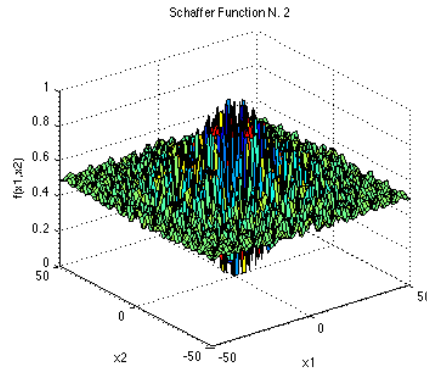
En el intervalo $x_i \in [-5.12, 5.12]$, para todo $i = 1, 2, \dots, d$.
y $d = 4$



(3) *Minimizar*

$$f(\mathbf{x}) = 0.5 + \frac{\sin^2(x_1^2 - x_2^2) - 0.5}{[1 + 0.001(x_1^2 + x_2^2)]^2}$$

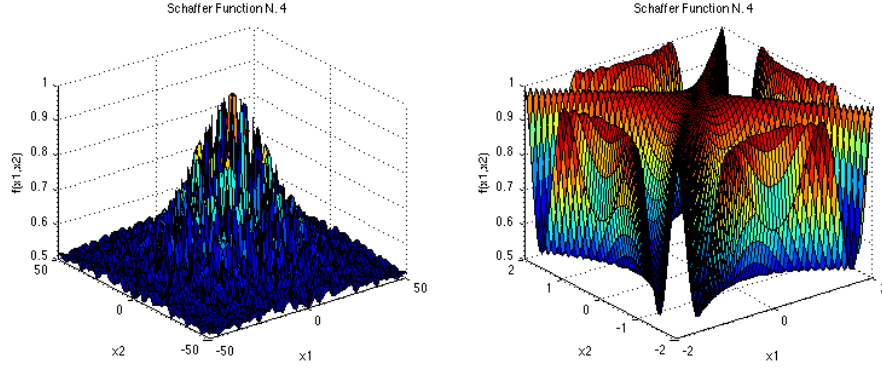
En el intervalo $x_i \in [-100, 100]$, para todo $i = 1, 2$.



(4) *Minimizar*

$$f(\mathbf{x}) = 0.5 + \frac{\cos(\sin(|x_1^2 - x_2^2|)) - 0.5}{[1 + 0.001(x_1^2 + x_2^2)]^2}$$

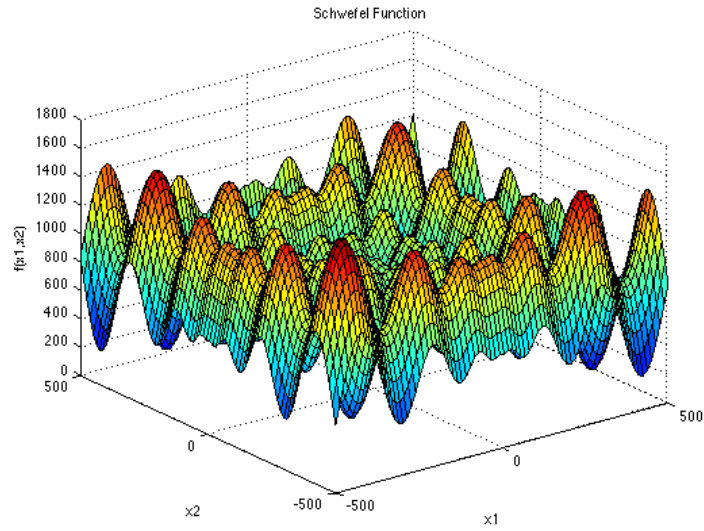
En el intervalo $x_i \in [-100, 100]$, para todo $i = 1, 2$.



(5) *Minimizar*

$$f(\mathbf{x}) = 418.9829d - \sum_{i=1}^d x_i \sin(\sqrt{|x_i|})$$

En el intervalo $x_i \in [-500, 500]$, para todo $i = 1, 2, \dots, d$.



y $d = 4$

(6) *Minimizar*

$$f(\mathbf{x}) = - \sum_{i=1}^m \left(\sum_{j=1}^4 (x_j - C_{ji})^2 + \beta_i \right)^{-1}, \text{ where}$$

$$m = 10$$

$$\beta = \frac{1}{10}(1, 2, 2, 4, 4, 6, 3, 7, 5, 5)^T$$

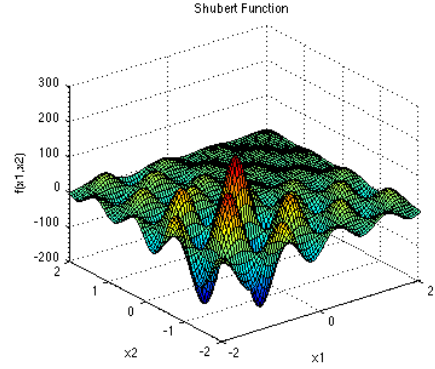
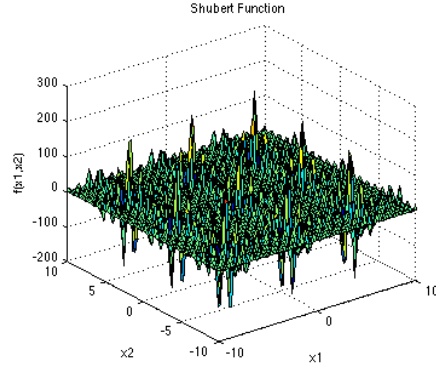
$$\mathbf{C} = \begin{pmatrix} 4.0 & 1.0 & 8.0 & 6.0 & 3.0 & 2.0 & 5.0 & 8.0 & 6.0 & 7.0 \\ 4.0 & 1.0 & 8.0 & 6.0 & 7.0 & 9.0 & 3.0 & 1.0 & 2.0 & 3.0 \\ 4.0 & 1.0 & 8.0 & 6.0 & 3.0 & 2.0 & 5.0 & 8.0 & 6.0 & 7.0 \\ 4.0 & 1.0 & 8.0 & 6.0 & 7.0 & 9.0 & 3.0 & 1.0 & 2.0 & 3.0 \end{pmatrix}$$

En el intervalo $x_i \in [0, 10]$, para todo $i = 1, 2, 3, 4$.

(7) *Minimizar*

$$f(\mathbf{x}) = \left(\sum_{i=1}^5 i \cos((i+1)x_1 + i) \right) \left(\sum_{i=1}^5 i \cos((i+1)x_2 + i) \right)$$

En el intervalo $x_i \in [-10, 10]$, para todo $i = 1, 2$.



(8) *Minimizar*

$$f_{\text{DeVilliersGlasser01}}(\mathbf{x}) = \sum_{i=1}^{24} [x_1 x_2^{t_i} \tanh[x_3 t_i + \sin(x_4 t_i)] \cos(t_i e^{x_5}) - y_i]^2$$

donde:

$$t_i = 0.1(i-1) \text{ and } y_i = 53.81(1.27^{t_i}) \tanh(3.012t_i + \sin(2.13t_i)) \cos(e^{0.507} t_i).$$

En el intervalo $x_i \in [1, 60]$, para todo $i = 1, n$.
donde la mejor solucin conocida es $f(x_i) = 0$