# 智慧型演化計算

(20240411)

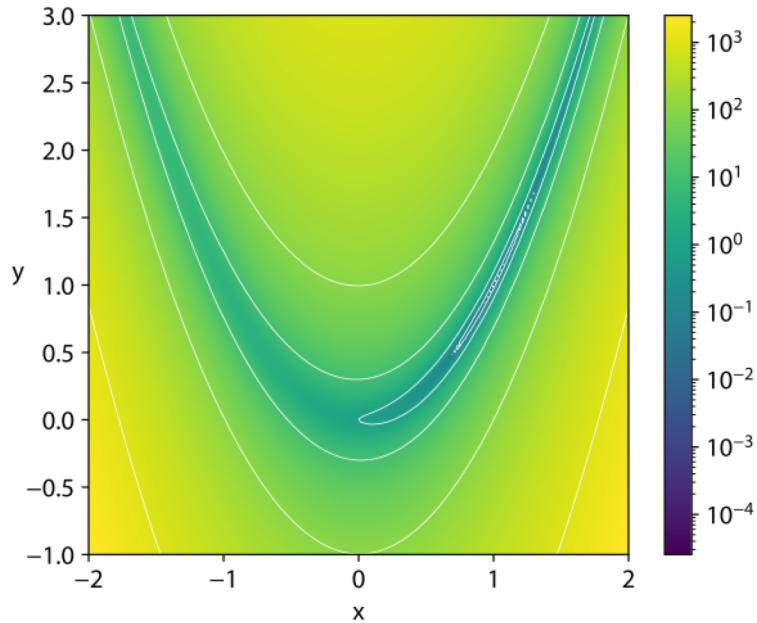
HW1 – Optimal solution

# Equation-1

- Optimization problem
  - Rosenbrock function:

$$\min f(\mathbf{x}) = \sum_{i=1}^{n-1}\left[100\left(x_{i+1} - x_i^2\right)^2 + (1 - x_i)^2\right]$$

  - Boundary in **x** [-3,3]

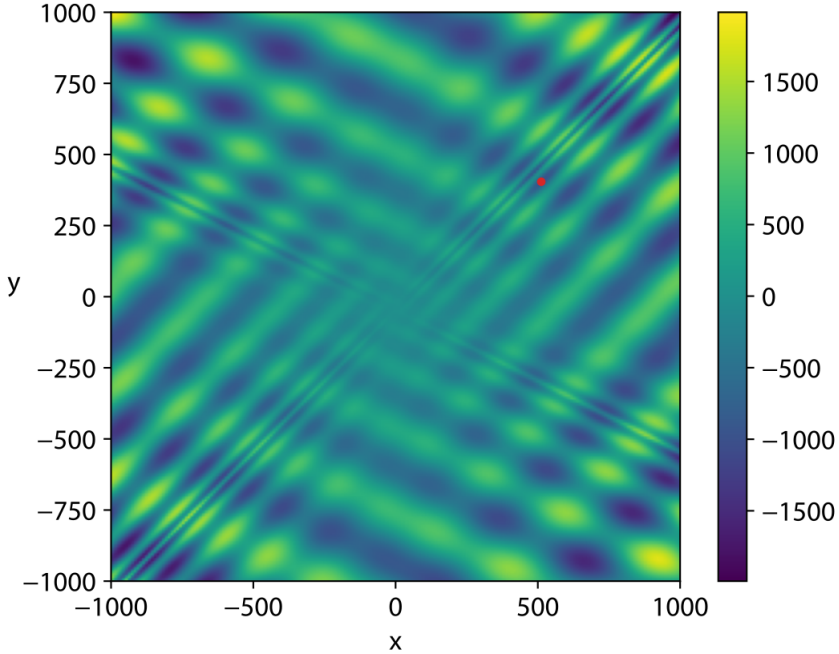


# Equation-2

- Optimization problem
  - Eggholder function:

$$\min f(x,y) = -(y+47)sin\sqrt{\left|\frac{x}{2}+(y+47)\right|} - x \cdot sin\sqrt{|x-(y+47)|}$$

  - Boundary in x & y
    - [-1000,1000]

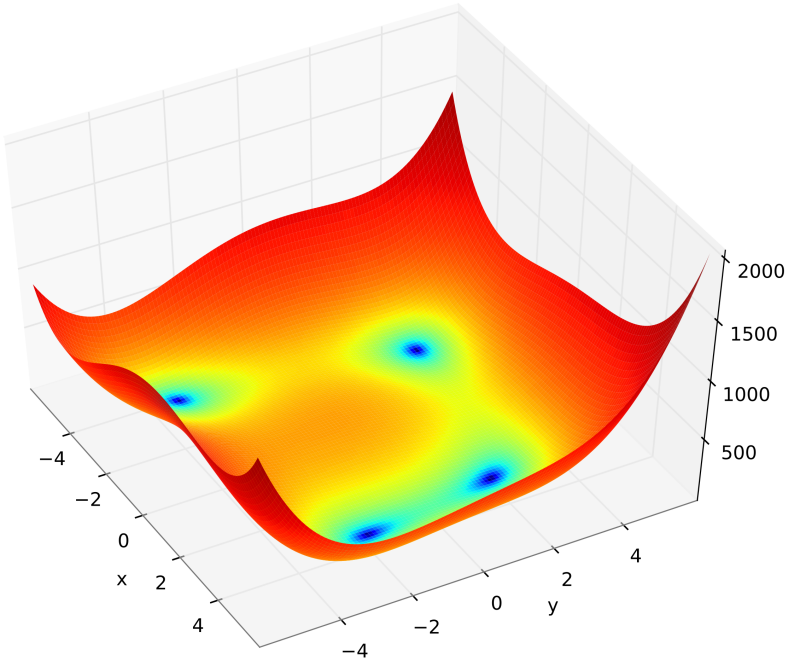


# Equation-3

- Optimization problem
  - Himmelblau's function:

$$\min f(x,y) = (x^2 + y - 11)^2 + (x + y^2 - 7)^2$$

  - Boundary in x & y [-5,5]

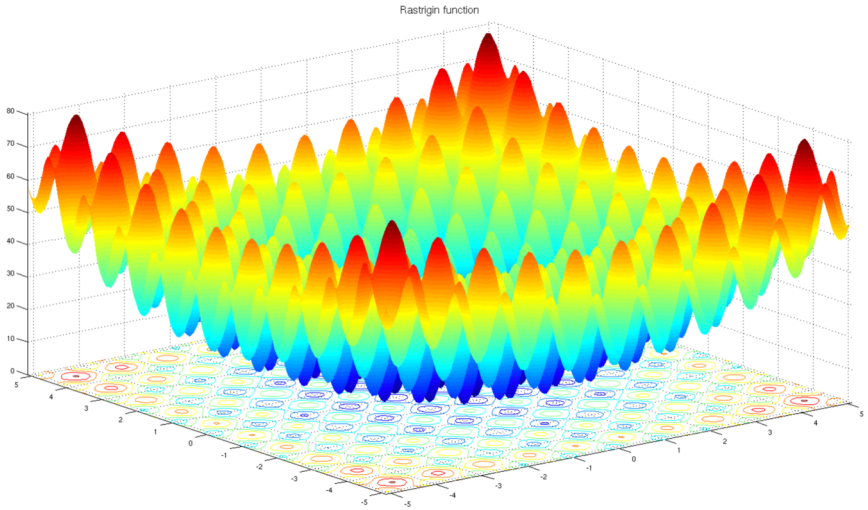


# Equation-4

- Optimization problem
  - Rastrigin function:

$$\min f(\mathbf{x}) = 10n + \sum_{i=1}^{n}[x_i^2 - Acos(2\pi x_i)]\,, where\ A = 10$$

  - Boundary in **x** [-5,5]



# 最佳化手段

- 採用至少一種演化型方法：
  - Genetic Algorithm (GA)
  - Evolution Strategy (ES)
  - Evolutionary Programming (EP)

# 作業內容

- 包含：
  - 程式碼說明：說明程式如何設計與實作方式
  - 執行結果：成果截圖
  - 成果說明：不同參數的效果、選用 crossover/mutation, selection method的效果
  - 心得
- Deadline:
  - 4/24