

Real number encoded GA

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Problem 1

$$\max f(x_1, x_2) = 21.5 + x_1 \sin(4\pi x_1) + x_2 \sin(20\pi x_2)$$

$$-3.0 \leq x_1 \leq 12.1$$

$$4.1 \leq x_2 \leq 5.8$$

Parameters

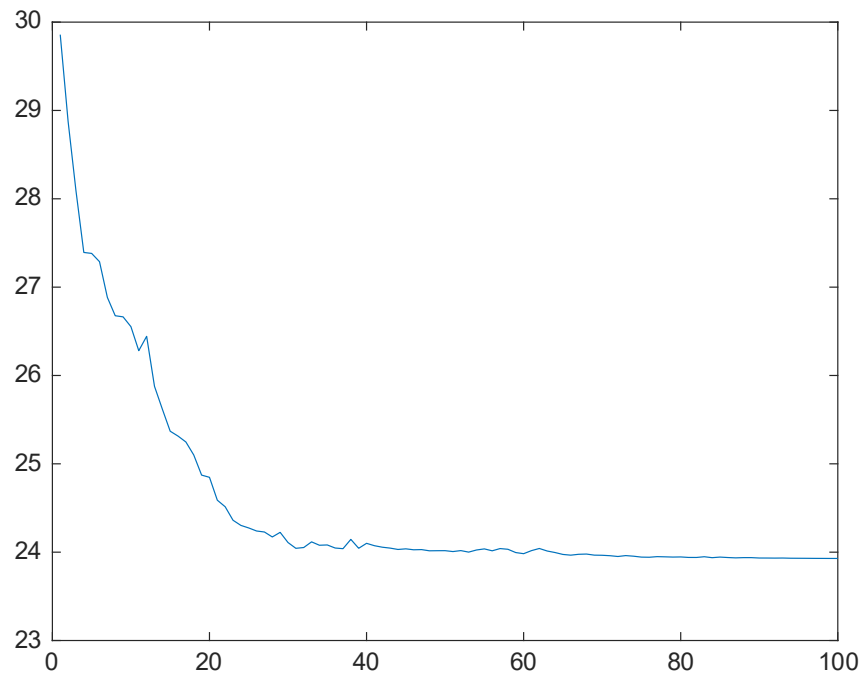
MUTATE RATE:0.01
CROSS RATE:0.75
ITERATION TIMES:1000
REPEAT TIME:50
POPULATION SIZE:10

Result

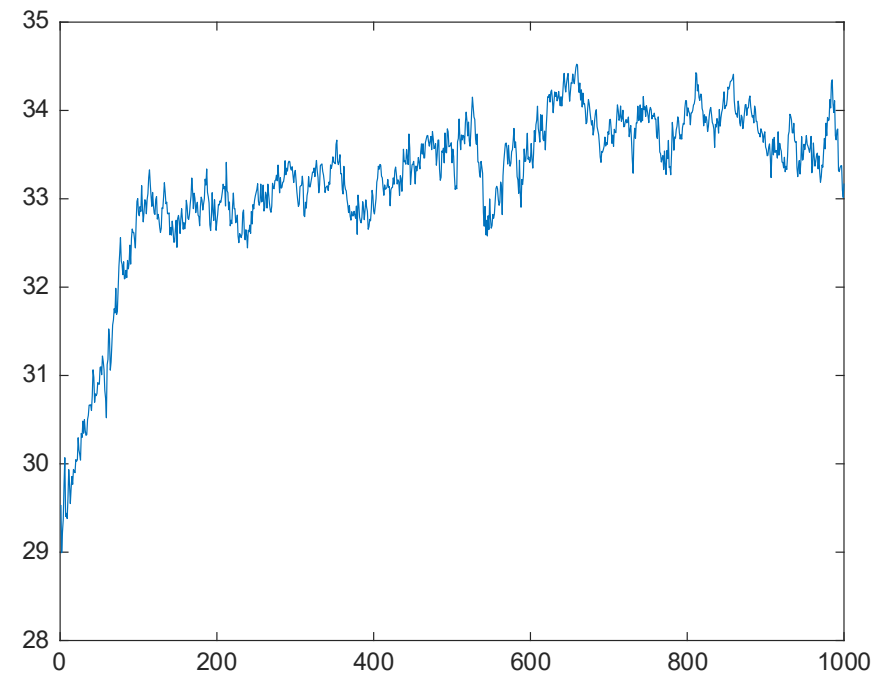
	Mean	Std.	Corr.
Real number	23.9288	3.6685	60.8098
Binary	33.1731	3.0267	84.3020

Result

Real number



Binary



Problem 2

$$\min \quad f(\mathbf{x}) = (x_1 - 2)^2 + (x_2 - 1)^2$$

$$\text{s.t.} \quad g_1(\mathbf{x}) = x_1 - 2x_2 + 1 = 0$$

$$g_2(\mathbf{x}) = \frac{x_1^2}{4} - x_2^2 + 1 \geq 0$$

Penalty function

$$P(x) = r_1 g_1(x) + r_2 g_2(x)$$

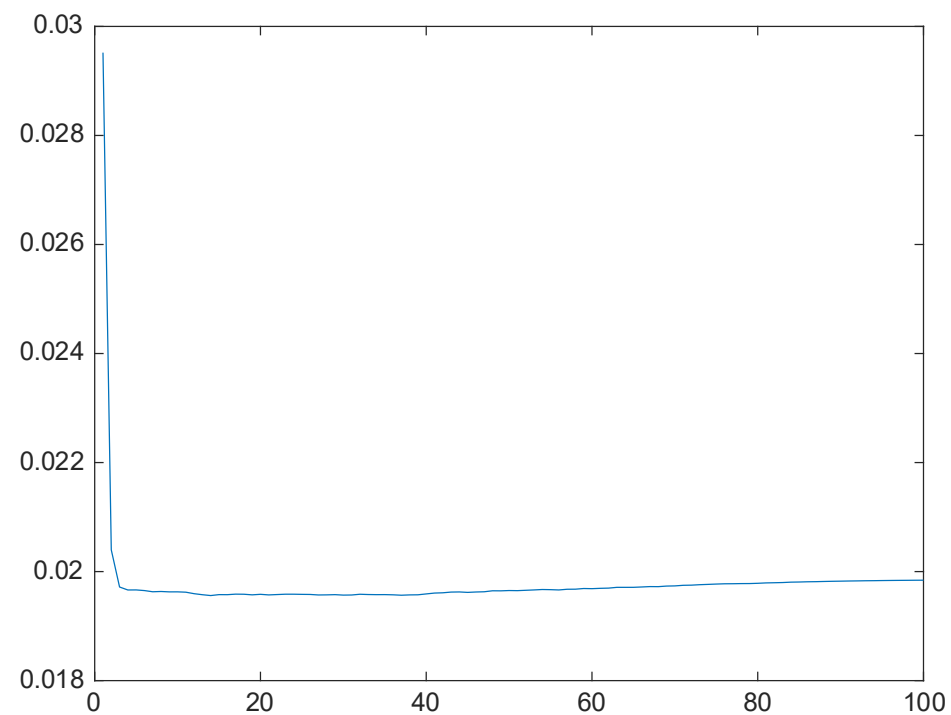
$$r_1 = 1, r_2 = 2$$

Parameters

MUTATE RATE:0.02
CROSS RATE:0.85
ITERATION TIMES:100
REPEAT TIME:50
POPULATION SIZE:400

Result

	Mean	Std.
Real number	0.0198	2.9228e-04



Problem 3

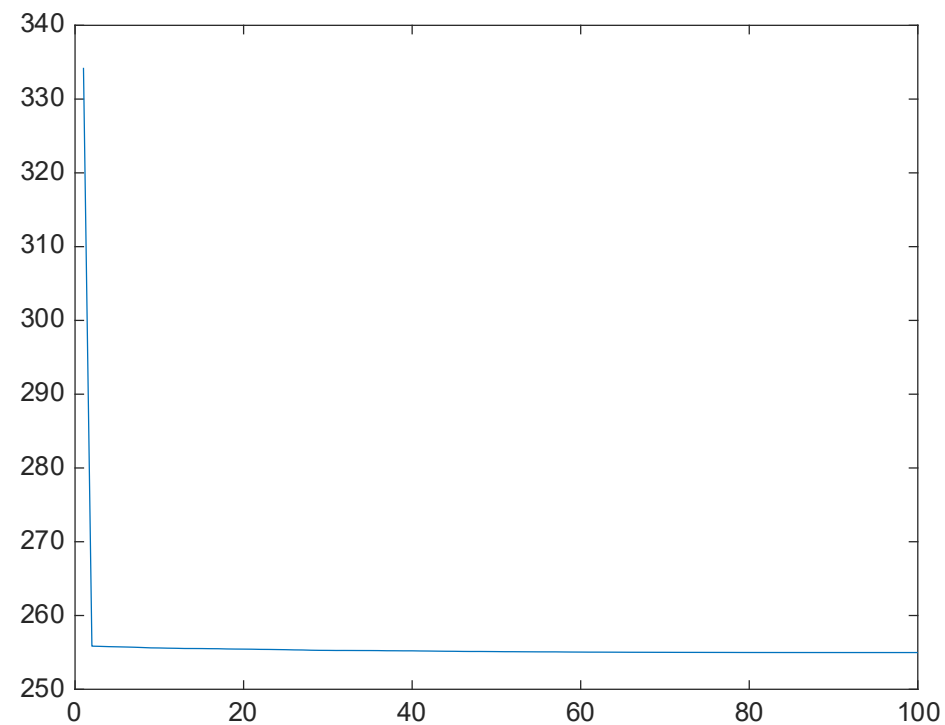
$$F(x) = \sum_{i=1}^n x_i^2, \text{ where } n = 30, -5.12 \leq x_i \leq 5.12$$

Parameters

MUTATE RATE:0.01
CROSS RATE:0.75
ITERATION TIMES:100
REPEAT TIME:50
POPULATION SIZE:100

Result

	Mean	Std.
Real number	254.9798	51.2087





Thank you for your attention