

Exercise

A given dataset (file *ES-data-???.dat*) contains a series of $N = 101$ measurements of input i_n and output o_n of a certain system $f(\cdot)$ (see Figure 1 as an example)

$$o = f(i), \quad (1)$$

which can be modeled using the following function

$$\hat{o} = a(i^2 - b \cos(c\pi i)). \quad (2)$$

Find values of the parameters a , b and c (using the Evolution Strategies method) minimizing the mean square error between o and \hat{o}

$$E = \frac{1}{N} \sum_{n=1}^N (o_n - \hat{o}(i_n))^2. \quad (3)$$

Generate the initial population according to uniform distribution $-10 \leq a, b, c \leq 10$, $0 \leq \sigma_a, \sigma_b, \sigma_c \leq 10$.

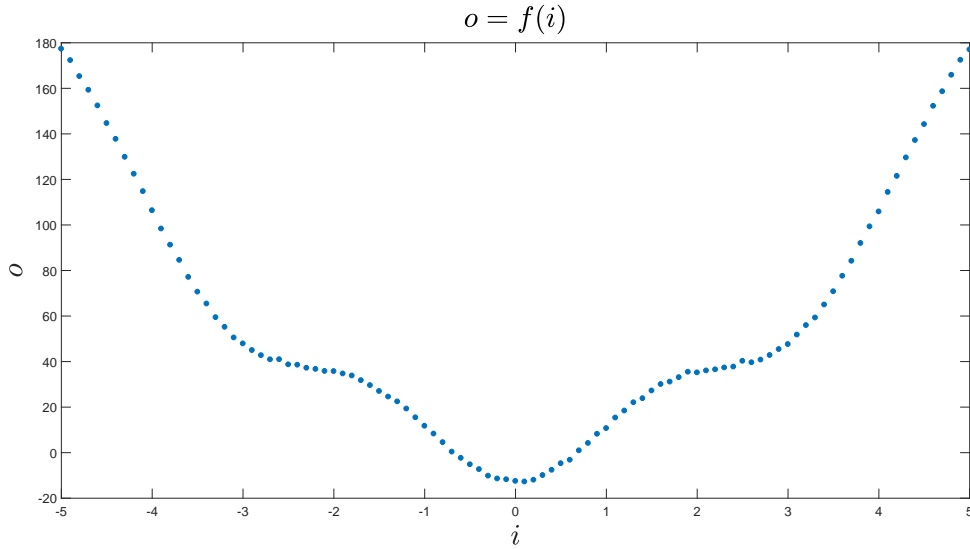


Figure 1: An example of the function $o = f(i)$.