

Exercise 1.1

Problem

Consider the sum-of-squares error function given by (1.2) in which the function $y(x, w)$ is given by the polynomial (1.1). Show that the coefficients $w = w_i$ that minimize this error function are given by the solution to the following set of linear equations: $\sum_{j=0}^M A_{ij} w_j = T_i$, where $A_{ij} = \sum_{n=1}^N (x_n)^{i+j}$, and $T_i = \sum_{n=1}^N (x_n)^i t_n$

Formulae

$$(1.1): y(x, \mathbf{w}) = w_0 + w_1 x + w_2 x^2 + \dots + w_M x^M = \sum_{j=0}^M w_j x^j$$

$$(1.2): E(\mathbf{w}) = \frac{1}{2} \sum_{n=1}^N y(x_n, \mathbf{w}) - t_n^2$$

Solution