Pattern Recognition and Machine learning

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Chapter 1 Introduction

Problem 1

Apply partial derivative to $E(\boldsymbol{\omega})$ with respect to ω_i and set it to zero.

$$\frac{\partial E(\boldsymbol{\omega})}{\partial \omega_i} = \sum_{n=1}^{N} (y - t_n) \frac{\partial y}{\partial \omega_i} = \sum_{n=1}^{N} (y - t_n)(x_n)^i = \sum_{n=1}^{N} (\sum_{j=0}^{M} \omega_j (x_n)^j - t_n)(x_n)^i = 0 \tag{1}$$

$$\sum_{j=0}^{M} \omega_j \sum_{n=1}^{N} (x_n)^{i+j} = \sum_{n=1}^{N} t_n (x_n)^i \tag{2}$$

where

$$A_i^j = \sum_{n=1}^{N} (x_n)^{i+j} \tag{3}$$

$$T_i = \sum_{n=1}^{N} t_n (x_n)^i \tag{4}$$

Problem 2