Linear Models for Regression and Classification

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Introduction

- Unsupervised Learning: Given points $\mathbf{x}_1, \ldots \mathbf{x}_N$: N points in $D-$ dimensional space.
  Aim: To cluster/group them/put them into clumps/classes, given no other information
- Supervised Learning: Given points $\mathbf{x}_1, \ldots \mathbf{x}_N$: N points in $D-$ dimensional space, and target values/labels $t_1, \ldots t_N$
  Aim of Regression: Prediction $t_i = y(\mathbf{x}_i, \mathbf{w}) + \varepsilon$,
  $\mathbf{w}$: parameters, ε: noise (modelled/unmodelled)
  Aim of Classification: Labels $t_i \in \{0, 1\}$ or $\{-1, 1\}$ or multi-class: $\mathbf{t}_i = [0 \ldots 010 \ldots] \equiv \mathscr{C}_j$