4.4

$$x_i = \begin{pmatrix} 1 \\ x_{i1} \\ \vdots \\ x_{iD} \end{pmatrix}, \quad X = \begin{pmatrix} x_1^T \\ x_2^T \\ \vdots \\ x_N^T \end{pmatrix}, \quad t = \begin{pmatrix} t_1 \\ t_2 \\ \vdots \\ t_N \end{pmatrix}, \quad w = \begin{pmatrix} w_0 \\ w_1 \\ \vdots \\ w_D \end{pmatrix}$$

事例群 $\{(x_i, t_i)\}_{i=1}^N$

リッジ回帰の誤差関数

$$E(w) = \sum_{i=1}^{N} (t_i - w^T x_i)^2 + \lambda w^T w$$

1

$$w^{(t+1)} \leftarrow w^{(t)} - \eta \nabla E(w^{(t)}) \quad \text{より}$$

$$w^{(t+1)} \leftarrow w^{(t)} - \eta \nabla \left(\sum_{i=1}^{N} (t_i - (w^{(t)})^T x_i)^2 + \lambda (w^{(t)})^T w^{(t)} \right)$$

2

$$w^{(t+1)} \leftarrow w^{(t)} - \eta \nabla \left((t_i - (w^{(t)})^T x_i)^2 + \lambda (w^{(t)})^T w^{(t)} \right) \quad (i \text{は } 1 \sim N \text{の数})$$