· 習題 1.

(1) $\alpha_i = 0 \Rightarrow y_i w^T x_i - 1 + \xi_i = 0$

$y_i w^T x_i = 1 - \xi_i$

$\geq 1 \quad (\because \xi_i \geq 0)$

(Q.E.D)

(2) $0 < \alpha_i < C \Rightarrow \beta_i \neq 0$

$\therefore \xi_i = 0 \quad (\because \beta_i \xi_i = 0)$

$y_i w^T x_i - 1 + \xi_i = 0$

$y_i w^T x_i = 1$ (Q.E.D)

(3) $\alpha_i = C \Rightarrow \beta_i = 0 \quad (\because \alpha_i + \beta_i = C)$

$\therefore \xi_i \neq 0 \quad \therefore \xi_i > 0$

$y_i w^T x_i = 1 - \xi_i$

$> 1 \quad (\because \xi_i > 0)$

(Q.E.D)

(4) $y_i w^T x_i > 1 \Rightarrow y_i w^T x_i - 1 + \xi_i > 0 \quad (\because \xi_i \geq 0)$

$\therefore \alpha_i = 0$

(5) $y_i w^T x_i < 1 \Rightarrow y_i w^T x_i - 1 + \xi_i \geq 0$ 下列

$\xi_i > 0 \quad \therefore \beta_i = 0$

$\therefore \alpha_i = C$

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