Harjoitus 3

(1) $\mu_0 = \begin{pmatrix} -1 \\ 1 \end{pmatrix} \qquad \mu_1 = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$

$$C_0 = \begin{bmatrix} 2 & 0,2 \\ 0,2 & 0,5 \end{bmatrix} \qquad C_1 = \begin{bmatrix} 3 & -1 \\ -1 & 1 \end{bmatrix}$$

$$C_0 + C_1 = \begin{bmatrix} 5 & -0.8 \\ -0.8 & 1.5 \end{bmatrix} [C]$$

$$C^{-1} = \frac{1}{6.86} \begin{bmatrix} 1.5 & 0.8 \\ 0.8 & 5 \end{bmatrix} = \begin{bmatrix} 0.2187 & 0.1166 \\ 0.1166 & 0.7289 \end{bmatrix}$$

$$C^{-1} \cdot \begin{bmatrix} 2 \\ 1 \end{bmatrix} = \begin{bmatrix} 0.2187 & 0.1166 \\ 0.1166 & 0.7289 \end{bmatrix} \begin{bmatrix} 2 \\ 1 \end{bmatrix} = \begin{bmatrix} 0.554 \\ 0.9621 \end{bmatrix}$$

2) $N(w^T\mu_1, w^T C_1 w) > N(w^T\mu_0, w^T C_0 w)$

$$N(\mu_1, \sigma_1^2) > N(\mu_0, \sigma_0^2)$$

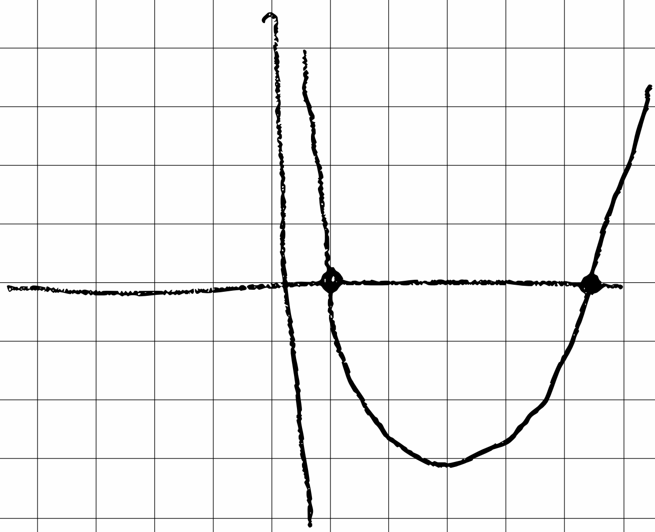
$$\frac{N(\mu_1, \sigma_1^2)}{N(\mu_0, \sigma_0^2)} > 1$$

$$\frac{1}{\sqrt{2\pi\sigma_1^2}} e^{-\frac{(x-\mu_1)^2}{2\sigma_1}} > \frac{1}{\sqrt{2\pi\sigma_0^2}} e^{-\frac{(x-\mu_0)^2}{2\sigma_0}}$$

$$\vdots$$

$$(\sigma_1^2 - \sigma_0^2)x^2 - 2(\sigma_1^2\mu_0 - \sigma_0^2\mu_1)x + (\sigma_1^2\mu_0^2 - \sigma_0^2\mu_1^2) >$$
$$> 2\sigma_1^2\sigma_0^2 \ln\left(\frac{\sigma_1}{\sigma_0}\right)$$

Подставим значения



$$0.885 < x < 5.418$$

$$w^T x = [0.55 \ \ 0.96] \begin{bmatrix} 1 \\ 2 \end{bmatrix} =$$

$$= \underline{2.49} \Rightarrow x \in C_1$$