Pattern Classification Homework #4

Two normal distribution are characterized by

$p(\underline{x}|S_i)=N(\underline{x},\underline{m}_i,\Sigma_i)$, i=1,2

$P(S_1)=P(S_2)=0.5$

$m_1=[1,0]^T$

$m_2=[-1,0]^T$

$\Sigma_1=\Sigma_2=\begin{bmatrix} 1 & 0.5 \\ 0.5 & 1 \end{bmatrix}$

(a) Draw the Bayes decision boundary which minimized the probability of error.

(b) Draw the Bayes decision boundary which minimized risk when

$C_{11}= C_{22}= 0$ and $C_{12}=2C_{21}$

(c) Repeat (a) and (b) for

$\Sigma_1=\begin{bmatrix} 1 & 0.5 \\ 0.5 & 1 \end{bmatrix}$, $\Sigma_2=\begin{bmatrix} 1 & -0.5 \\ -0.5 & 1 \end{bmatrix}$