Assignment 6

Generate the datasets A and B in R^2 with each of them consisting 2000 data points from normal distribution. The dataset A and B has been drawn from the N (μ_1, Σ_1) and N(μ_2, Σ_2) . Let us fix the μ_1 = [0,0] and μ_2 = [2,2].

a. Find the optimal decision boundary for the classification of the dataset A and B using $\Sigma_1 = \Sigma_2 = \begin{matrix} 0.6 & 0 \\ 0 & 0.6 \end{matrix}$. Plot the dataset A and B with different colors and plot the obtained optimal decision boundary. Comment on the characteristics of obtained decision boundary.

b. Find the optimal decision boundary for the classification of the dataset A and B using $\Sigma_1 = \Sigma_2 = \begin{matrix} 0.7 & 0 \\ 0 & 0.3 \end{matrix}$. Plot the dataset A and B with different colors and plot the obtained optimal decision boundary. Comment on the characteristics of obtained decision boundary.

c. Find the optimal decision boundary for the classification of the dataset A and B using $\Sigma_1 = \Sigma_2 = \begin{matrix} 0.6 & 0.25 \\ 0.25 & 0.4 \end{matrix}$. Plot the dataset A and B with different colors and plot the obtained optimal decision boundary. Comment on the characteristics of obtained decision boundary.