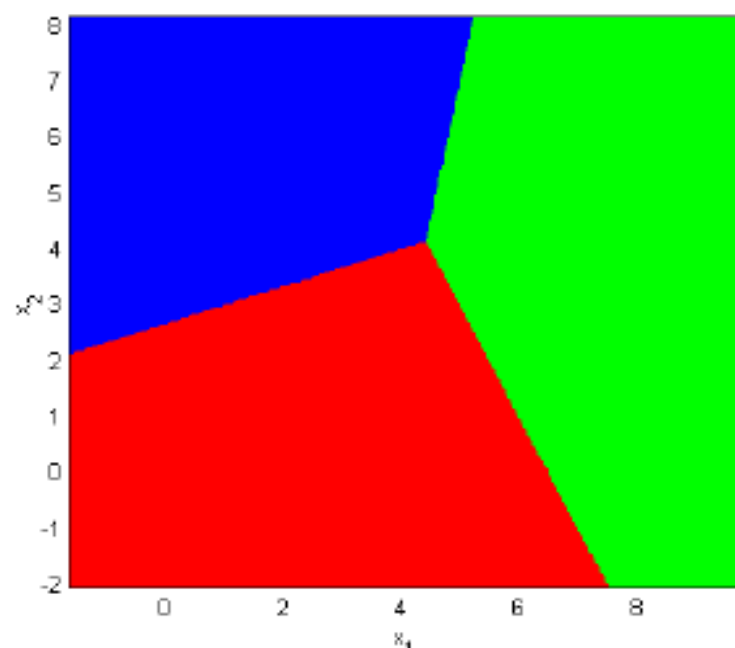
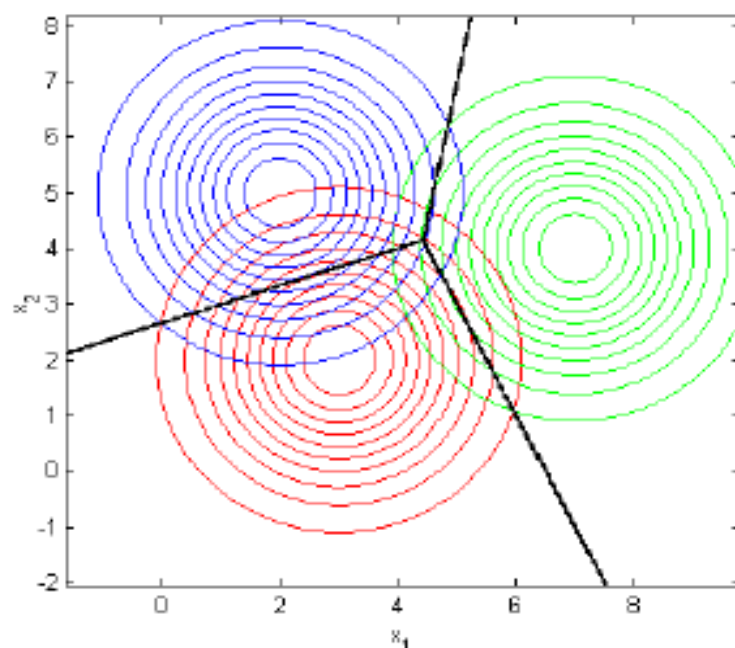
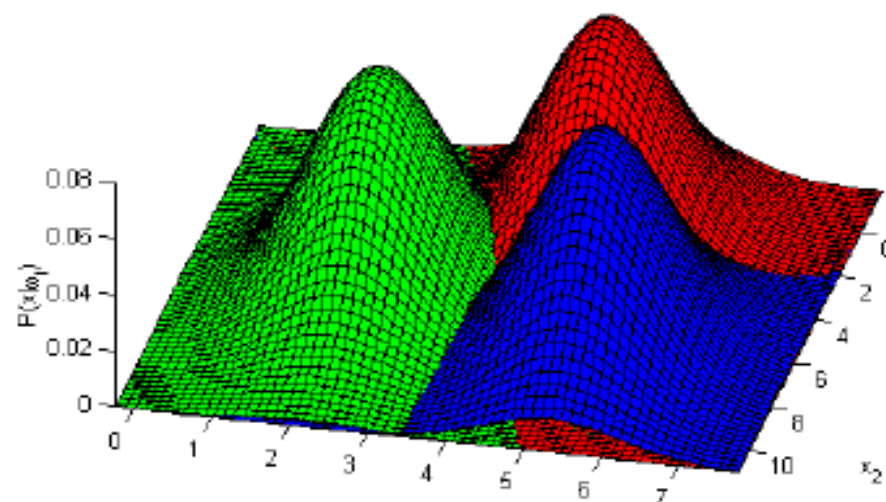


Case 1: $\Sigma_i = \sigma^2 I$, example

- To illustrate the previous result, we will compute the decision boundaries for a 3-class, 2-dimensional problem with the following class mean vectors and covariance matrices and equal priors

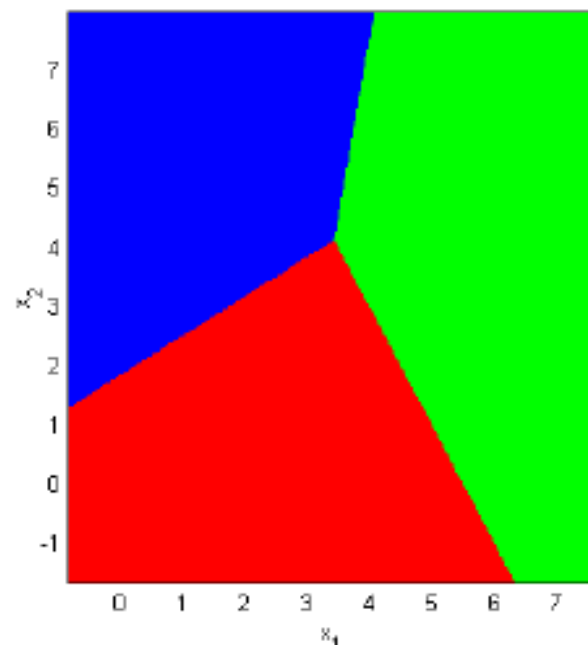
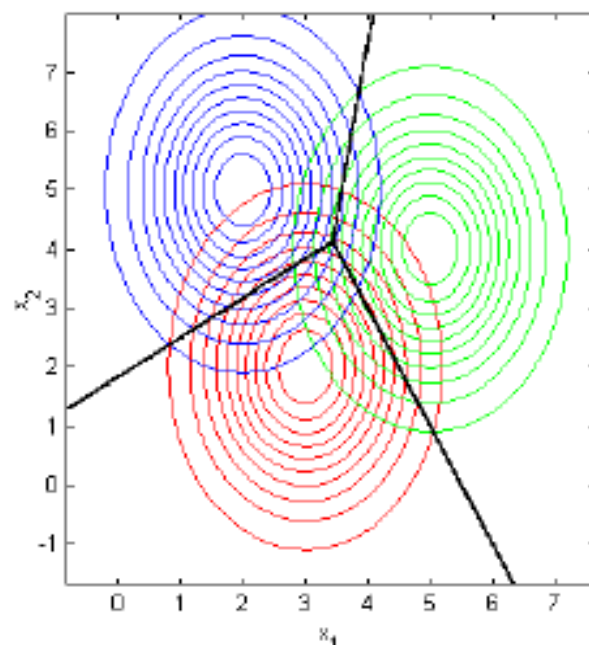
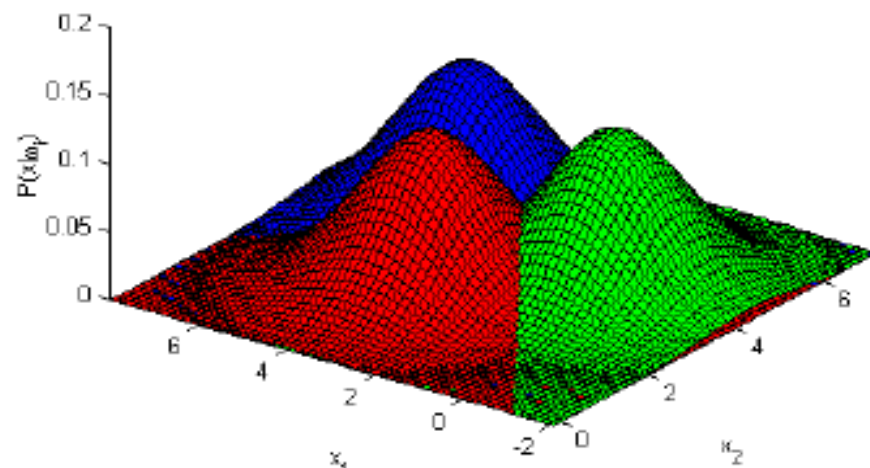
$$\begin{aligned}\mu_1 &= \begin{bmatrix} 3 & 2 \end{bmatrix}^T & \mu_2 &= \begin{bmatrix} 7 & 4 \end{bmatrix}^T & \mu_3 &= \begin{bmatrix} 2 & 5 \end{bmatrix}^T \\ \Sigma_1 &= \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix} & \Sigma_2 &= \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix} & \Sigma_3 &= \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}\end{aligned}$$



Case 2: $\Sigma_i = \Sigma$ (Σ diagonal), example

- To illustrate the previous result, we will compute the decision boundaries for a 3-class, 2-dimensional problem with the following class mean vectors and covariance matrices and equal priors

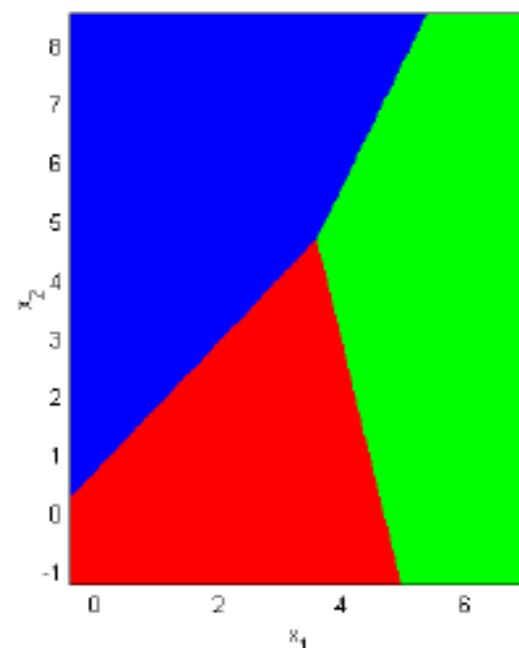
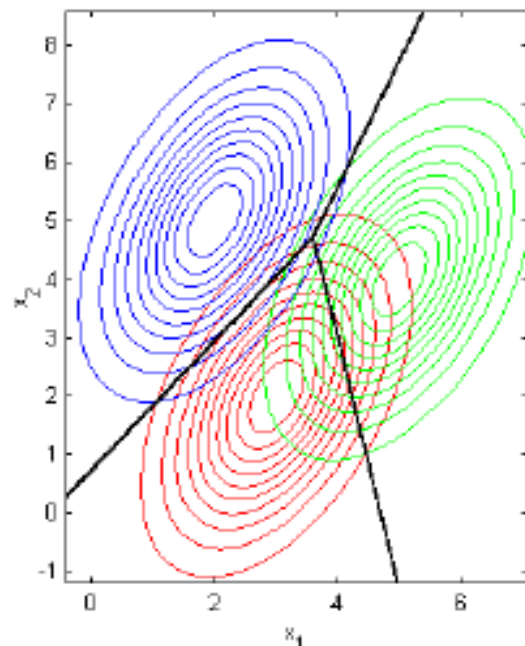
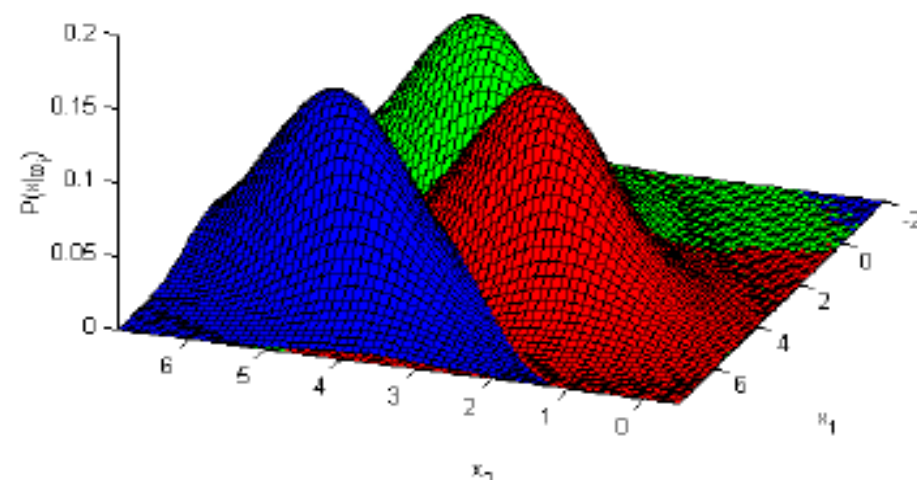
$$\begin{aligned}\mu_1 &= \begin{bmatrix} 3 & 2 \end{bmatrix}^T & \mu_2 &= \begin{bmatrix} 5 & 4 \end{bmatrix}^T & \mu_3 &= \begin{bmatrix} 2 & 5 \end{bmatrix}^T \\ \Sigma_1 &= \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix} & \Sigma_2 &= \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix} & \Sigma_3 &= \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}\end{aligned}$$



Case 3: $\Sigma_i = \Sigma$ (Σ non-diagonal), example

- To illustrate the previous result, we will compute the decision boundaries for a 3-class, 2-dimensional problem with the following class mean vectors and covariance matrices and equal priors

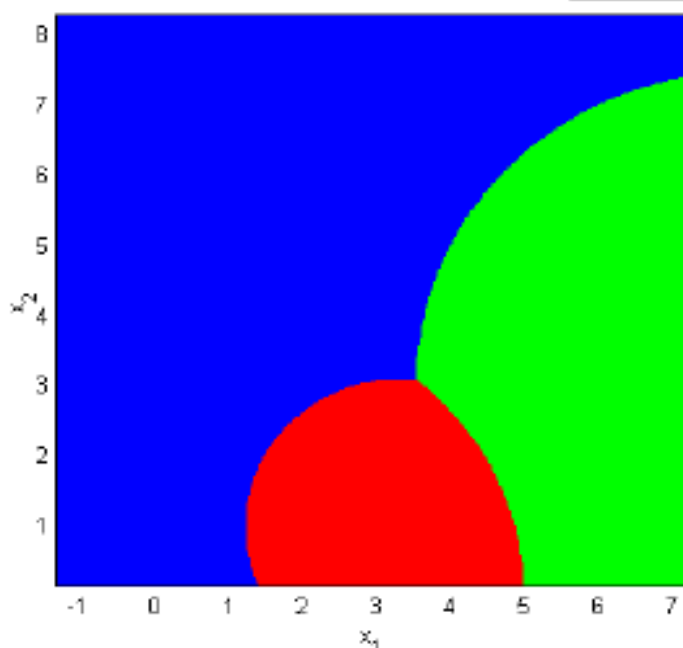
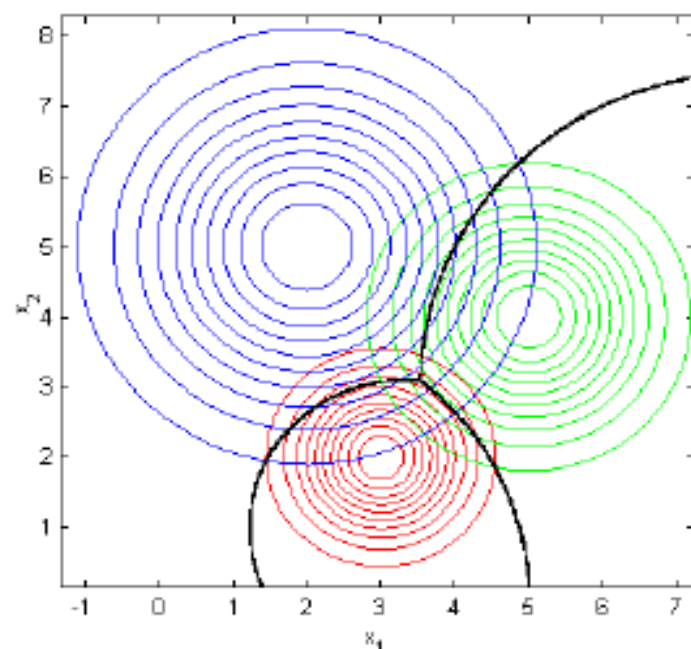
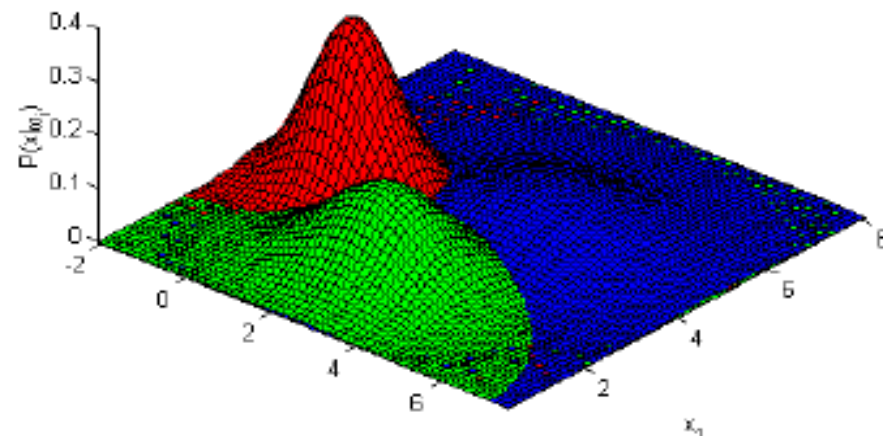
$$\begin{aligned}\mu_1 &= [3 \ 2]^T & \mu_2 &= [5 \ 4]^T & \mu_3 &= [2 \ 5]^T \\ \Sigma_1 &= \begin{bmatrix} 1 & 0.7 \\ 0.7 & 2 \end{bmatrix} & \Sigma_2 &= \begin{bmatrix} 1 & 0.7 \\ 0.7 & 2 \end{bmatrix} & \Sigma_3 &= \begin{bmatrix} 1 & 0.7 \\ 0.7 & 2 \end{bmatrix}\end{aligned}$$



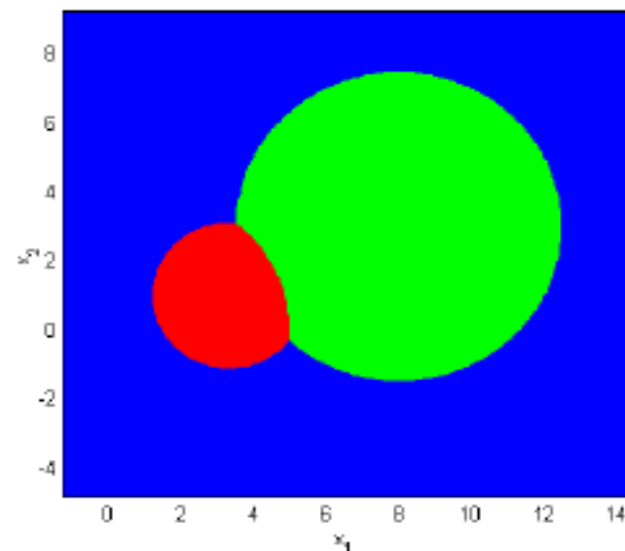
Case 4: $\Sigma_i = \sigma_i^2 I$, example

- To illustrate the previous result, we will compute the decision boundaries for a 3-class, 2-dimensional problem with the following class mean vectors and covariance matrices and equal priors

$$\begin{aligned}\mu_1 &= \begin{bmatrix} 3 & 2 \end{bmatrix}^T & \mu_2 &= \begin{bmatrix} 5 & 4 \end{bmatrix}^T & \mu_3 &= \begin{bmatrix} 2 & 5 \end{bmatrix}^T \\ \Sigma_1 &= \begin{bmatrix} 0.5 & 0 \\ 0 & 0.5 \end{bmatrix} & \Sigma_2 &= \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} & \Sigma_3 &= \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}\end{aligned}$$



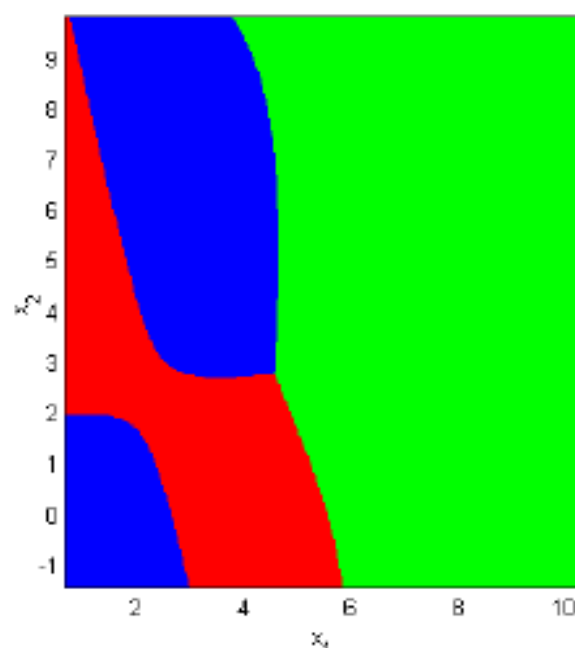
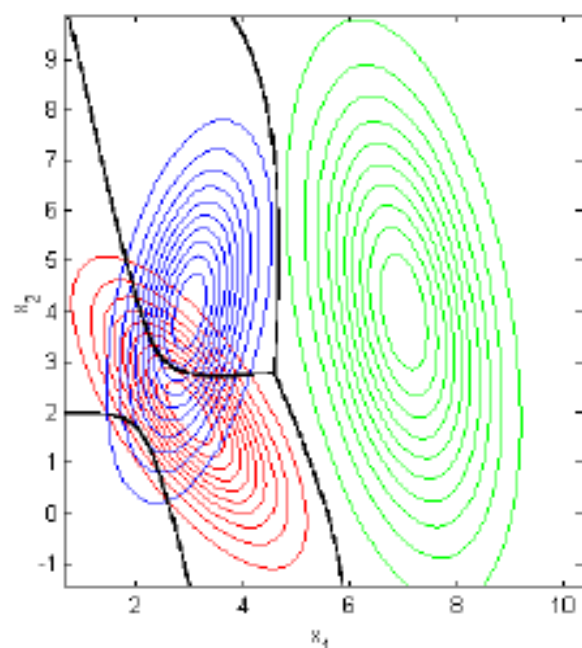
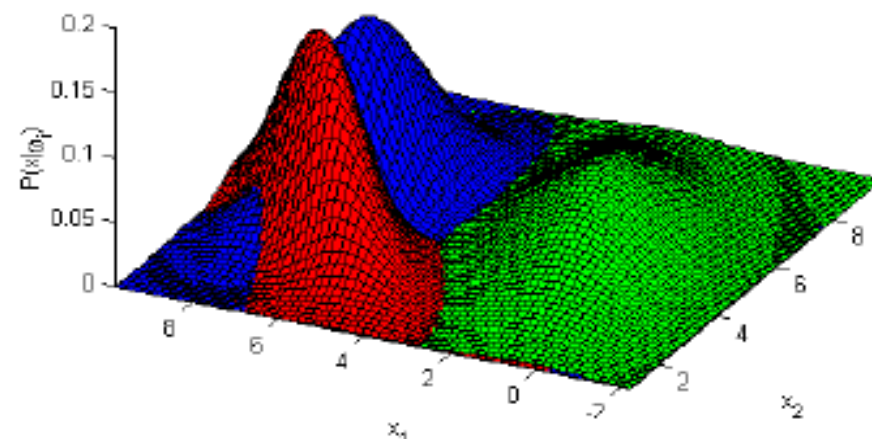
Zoom
out



Case 5: $\Sigma_i \neq \Sigma_j$ general case, example

- To illustrate the previous result, we will compute the decision boundaries for a 3-class, 2-dimensional problem with the following class mean vectors and covariance matrices and equal priors

$$\begin{aligned}\mu_1 &= \begin{bmatrix} 3 & 2 \end{bmatrix}^T & \mu_2 &= \begin{bmatrix} 5 & 4 \end{bmatrix}^T & \mu_3 &= \begin{bmatrix} 2 & 5 \end{bmatrix}^T \\ \Sigma_1 &= \begin{bmatrix} 1 & -1 \\ -1 & 2 \end{bmatrix} & \Sigma_2 &= \begin{bmatrix} 1 & -1 \\ -1 & 7 \end{bmatrix} & \Sigma_3 &= \begin{bmatrix} 0.5 & 0.5 \\ 0.5 & 3 \end{bmatrix}\end{aligned}$$



Zoom
out

