MISAEL MORALES - MATH 7993 NUMERICAL OPTIMIZATION - PROJECT
OPTIMIZATION OF MULTIVARIATE GAUSSIAN MIXTURE MODEL
Real Mu1: [-2.00, 3.00]
Real Mu2: [4.00, -5.00]
Real Sigma1: [2.00 0.00 ; 1.00 5.00]
Real Sigma2: [8.00 1.00 ; 1.00 8.00]
Real Proportions: [0.700, 0.300]

Initial Guess Mu1: [-2.00, 2.00]
Initial Guess Mu2: [5.00, -5.00]
Initial Guess Sigma1: [50.00 5.00 ; 5.00 50.00]
Initial Guess Sigma2: [30.00 1.00 ; 0.10 3.00]
Initial Guess Proportions: [0.900, 0.100]

EM-estimated Mu1: [-1.5617, 2.2264]
EM-estimated Mu2: [5.1835, -5.6129]
EM-estimated Sigma1: [3.261 -1.116 ; -1.116 10.350]
EM-estimated Sigma2: [6.171 2.041 ; 2.041 7.799]
EM-estimated Proportions: [0.8015, 0.1985]. Sum: 1.0000
Stopping Criteria: max iterations (5) | tolerance (1.0e-06)
Maximum number of iterations (5) was reached before convergence!

Optimization Toolbox subroutine:

Exiting: Maximum number of iterations has been exceeded
         - increase MaxIter option.
         Current function value: 4823.364029

NMS Optimization-estimated Mu1: [-1.9505, 3.0876]
NMS Optimization-estimated Mu2: [-1.9505, 3.0876]
NMS Optimization-estimated Sigma1: [1.690 -1.784 ; 0.639 5.091]
NMS Optimization-estimated Sigma2: [11.758 2.639 ; 2.164 8.681]
NMS Optimization-estimated Proportions: [0.6979, 0.3021]. Sum: 1.000

Local minimum possible.

fminunc stopped because it cannot decrease the objective function
along the current search direction.

<stopping criteria details>

QN Optimization-estimated Mu1: [-1.9513, 3.1167]
QN Optimization-estimated Mu2: [3.7381, -4.9356]
QN Optimization-estimated Sigma1: [1.686 -1.116 ; 0.644 5.148]
QN Optimization-estimated Sigma2: [9.496 2.041 ; 0.085 8.211]
QN Optimization-estimated Proportions: [0.6962, 0.3038]. Sum: 1.000

EM-estimated Negative Log-Likelihood: 5019.4828
fminsearch Negative Log-Likelihood: 4823.3640

```
fminunc Negative Log-Likelihood:                4815.8169
Original Parameters Negative Log-Likelihood: 4837.4388
Elapsed time is 11.011121 seconds.
>>
```