

# STAT 200B: Assignment 3

due Tuesday February 17th 2009 in class

## Homework

From the book: Problems 3.5.9 and 3.5.11 (a) through (e)

## Lab

1. Consider the density

$$f(\mathbf{v}) = \lambda * N(\mathbf{v}; \boldsymbol{\mu}_1, \boldsymbol{\Omega}_1) + (1 - \lambda) * N(\mathbf{v}; \boldsymbol{\mu}_2, \boldsymbol{\Omega}_2)$$

where  $\lambda = 0.3$  and

$$\begin{aligned}\boldsymbol{\mu}_1 &= \begin{pmatrix} 0 \\ 1 \end{pmatrix} \\ \boldsymbol{\mu}_2 &= \begin{pmatrix} 3 \\ -1 \end{pmatrix} \\ \boldsymbol{\Omega}_1 &= \begin{pmatrix} 1 & 0.5 \\ 0.5 & 1 \end{pmatrix} \\ \boldsymbol{\Omega}_2 &= \begin{pmatrix} 1 & -0.8 \\ -0.8 & 2 \end{pmatrix}\end{aligned}$$

Draw 2000 points from this density and plot these points.

2. Consider the density that is uniform over a sphere of radius 5. Two points are independently drawn from this density. Use rejection sampling to estimate the expected value of the Euclidian distance between the two points.