Assignment 5

Due date: November 27th, 2017
Total points: 10

1. You observe data $\{X_i, Y_i\}_{i=1}^N$ and you believe that
$$X_i \mid Z_i = k \sim N(\mu_k - \alpha Y_i, \sigma^2),$$
where the class label $Z_i \in \{1, \dots, K\}$ is unobserved, $P(Z_i = k) = \pi_k$. Develop the EM algorithm for estimating $\alpha, \pi_k, \mu_k, \sigma^2$. Submit this part in hard copy.

2. Develop an R function to fit the above mixture distribution with the following API:
   `norm.mix(x, y, K = 2)`
   where x and y are vectors of numeric values, K an integer with default value 2. The return value should be a list that contains "alpha", "pi", "mu", and "sigsq", where "pi" and "mu" are vectors of length K. Submit your R code online.