1/

Summary of the EM Algorithm for the Gaussian case:

$$D_1^i = \mu_2^{old} + \frac{\sigma_2^{old}}{1-\Phi\left(\frac{s_i-\mu_2^{old}}{\sigma_2^{old}}\right)}\,\phi\left(\frac{s_i-\mu_2^{old}}{\sigma_2^{old}}\right)$$

$$D_2^i = (\mu_2^{old})^2 + (\sigma_2^{old})^2 + \frac{\mu_2^{old}\,\sigma_2^{old}}{1-\Phi\left(\frac{s_i-\mu_2^{old}}{\sigma_2^{old}}\right)}\,\phi\left(\frac{s_i-\mu_2^{old}}{\sigma_2^{old}}\right)$$

$$+ \frac{(\sigma_2^{old})^2}{1-\Phi\left(\frac{s_i-\mu_2^{old}}{\sigma_2^{old}}\right)}\,\phi\left(\frac{s_i-\mu_2^{old}}{\sigma_2^{old}}\right) s_i$$

$$X_1^i = \mu_1^{old} + \frac{\sigma_1^{old}}{1-\Phi\left(\frac{s_i-\mu_1^{old}}{\sigma_1^{old}}\right)}\,\phi\left(\frac{s_i-\mu_1^{old}}{\sigma_1^{old}}\right)$$

$$X_2^i = (\mu_1^{old})^2 + (\sigma_1^{old})^2 + \frac{\mu_1^{old}\,\sigma_2^{old}}{1-\Phi\left(\frac{s_i-\mu_1^{old}}{\sigma_1^{old}}\right)}\,\phi\left(\frac{s_i-\mu_1^{old}}{\sigma_1^{old}}\right)$$

$$+ \frac{(\sigma_1^{old})^2}{1-\Phi\left(\frac{s_1-\mu_1^{old}}{\sigma_1^{old}}\right)}\,\phi\left(\frac{s_i-\mu_1^{old}}{\sigma_1^{old}}\right) s_i$$

2/

$$\mu_1^{new} = \frac{1}{2N} \sum_{i=1}^{N} (x_1^i + S_i)$$

$$(\sigma_1^2)^{new} = \frac{1}{2N} \sum_{i=1}^{N} (x_2^i + S_i^2) - \left[\frac{1}{2N} \sum_{i=1}^{N} (x_1^i + S_i) \right]^2$$

$$\mu_2^{new} = \frac{1}{2N} \sum_{i=1}^{N} (D_1^i + S_i)$$

$$(\sigma_2^2)^{new} = \frac{1}{2N} \sum_{i=1}^{N} (D_2^i + S_i^2) - \left(\frac{1}{2N} \sum_{i=1}^{N} (D_1^i + S_i) \right)^2$$

Iterate until convergence.