02424 Week 9

Since you are having the Assignment No. 2 todays exercise is rather limited.

As mentioned in the book on page 171 is sometimes of interest to estimate the random effects. This can be done by writing down the joint density for the observable random variables Y and the unobservable μ. This is often called the *hierarchical likelihood*:

$$L(\mu, \sigma^2, \gamma, \mu) = f(y|\mu) f(\mu)$$

$$L = \frac{1}{\sigma^N} \exp\left\{ - \frac{SSE + \sum_i n_i (\bar{y}_i - \mu_i)^2}{2\sigma^2} \right\} \frac{1}{(\gamma\sigma^2)^{k/2}} \exp\left\{ - \frac{\sum_i (\mu_i - \mu)^2}{2\gamma\sigma^2} \right\}$$

Problem: Derive the equation above for the hierarchical likelihood.