Homework 5

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$$p(t_i|x_i, \sigma_{ti}, T_i) = \frac{1}{\sqrt{2\pi\sigma_{ti}^2}} exp(-\frac{[t_i - T_i]^2}{2\sigma^2}) \tag{1}$$

$$L = \prod_{n=1}^{i} p(t_i|x_i, \sigma_{ti}, T_i) \tag{2}$$

$$ln(L) = \sum_{i=1}^{N} ln(\frac{1}{\sqrt{2\pi\sigma_{ti}^2}}) - \frac{(t_i - T_i)^2}{2\sigma_{ti}^2} \tag{3}$$

$$\frac{d}{dt}(ln(L)) = \frac{d}{dt}(\sum_{i=1}^{N} ln(\frac{1}{\sqrt{2\pi\sigma_{ti}^2}}) - \frac{(t_i - T_i)^2}{2\sigma_{ti}^2})) \tag{4}$$

$$\frac{d}{dt}(ln(L)) = \sum_{i=1}^{N} \frac{(t_i - T_i)}{\sigma_{ti}^2} \tag{5}$$

Set the left hand side to 0 to find the minimum.

$$0 = \sum_{i=1}^{N} \frac{(t_i - T_i)}{\sigma_{ti}^2} \tag{6}$$

$$t_i = T_i \tag{7}$$

is the minimization of the likelihood function.