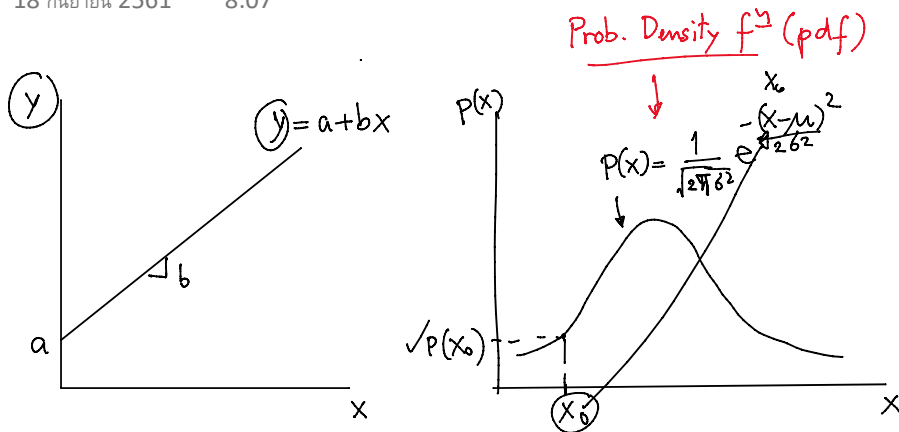


MLE

18 กันยายน 2561 8:07



pdf. { - Parameters (μ, σ^2) are given. - (Known)
 - Variables (x, y) are unknown.

pdf. $p(x, \mu, \sigma^2) \equiv L(\mu, \sigma^2, x)$ Likelihood f^n

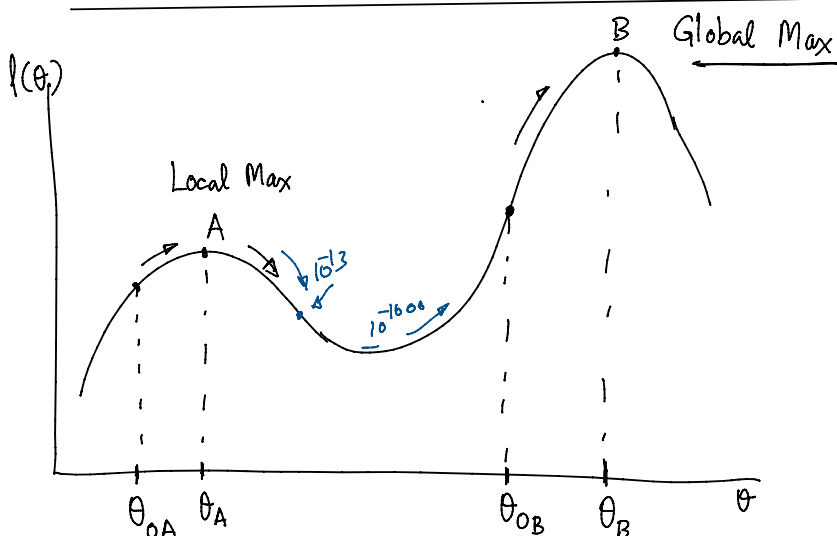
Likelihood f^n { parameter - unknown
 Variables - Given (known)

$$G(\theta) \cong G(\hat{\theta}_0) + H(\hat{\theta}_0)(\theta - \hat{\theta}_0) = 0$$

$$\underline{G(\hat{\theta}_0)} + \underline{H(\hat{\theta}_0)\theta} - \underline{H(\hat{\theta}_0)\hat{\theta}_0} = 0$$

$$\cancel{H(\hat{\theta}_0)} H(\hat{\theta}_0) \theta = \cancel{H(\hat{\theta}_0)} \cancel{H(\hat{\theta}_0)} \hat{\theta}_0 - \cancel{H(\hat{\theta}_0)} G(\hat{\theta}_0)$$

$$\theta = \hat{\theta}_0 - H(\hat{\theta}_0)^{-1} G(\hat{\theta}_0)$$



Issues of Concern

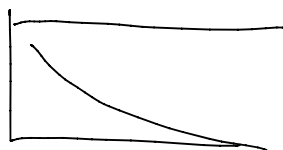
1. Initial Value $\rightarrow$ Global Max vs Local Max
 - Grid Search
 - Depend on the model.

2. Algorithm

3. Convergence Value $10^{-13} \rightarrow 10^{-1000}$

4. Maximum Iterative Times.

- Converge vs Fail to converge.



Evaluation

	<u>OLS</u>	<u>MLE</u>
1. Sign & Meaning.	$\frac{1}{\Delta x} \rightarrow \frac{\partial}{\partial y}$	Depend on the model.
2. Overall Test -	F-test	Chi-squares-test
3. $R^2 = 0.9$	Interpretation 90% Comparison	Interpret Comparing model = Log-Likelihood Value
4. Individual Test	t-test	Z-test.

Overall Test

	<u>OLS</u>	<u>MLE</u>
<u>Unrestricted Model</u>	$y_i = \beta_1 + \overset{=0}{\beta_2} x_{2i} + \dots + \overset{=0}{\beta_k} x_{ki} + u_i \rightarrow RSS_{UR}$	L_{UR}
<u>Restricted Model</u>	$y_i = \beta_1 + u_i \rightarrow RSS_R$	L_R
$H_0: \beta_2 = \beta_3 = \dots = \beta_k = 0$		$\log\left(\frac{L_{UR}}{L_R}\right)$
F-test = $\frac{TSS_R - RSS_{UR}/k-1}{RSS_{UR}/n-k}$		
F-test = $\frac{ESS_{UR}/k-1}{RSS_{UR}/n-k}$		$2 \cdot (\log L_{UR} - \log L_R) \sim \chi^2_{(k-1)}$