

Errata: Statistics for Mechanical Engineers Notes, 2009

page 4.4, example 1

eg: If the likelihood function is given by

$$L(\theta) = e^{-30\theta}\theta^{10}(1-\theta)^{20} \quad (0 < \theta < 1).$$

Find the maximum likelihood estimate of θ and its standard error.

$$\ln L = -30\theta + 10 \ln \theta + 20 \ln(1 - \theta);$$

$$\frac{\partial \ln L}{\partial \theta} = -30 + \frac{10}{\theta} - \frac{20}{1-\theta}; \quad \frac{\partial \ln L}{\partial \theta} = 0 \Rightarrow \hat{\theta} = 0.184;$$

$$\frac{\partial^2 \ln L}{\partial \theta^2} = -\frac{10}{\theta^2} - \frac{20}{(1-\theta)^2}$$
$$\Rightarrow \text{se}(\hat{\theta}) = 1/\sqrt{\frac{10}{0.184^2} + \frac{20}{0.816^2}} = 0.055.$$

page 8.8, line-2

(d) approx 95% PI: $2.618 \pm 2s = (2.578, 2.658)$.

[exact 95% PI = (2.573, 2.663)].