

Question #217

Key: E

Begin with

y	350	500	1000	1200	1500
s	2	2	1	1	1
r	10	8	5	2	1

$$\text{Then } \hat{S}_1(1250) = \frac{8}{10} \frac{6}{8} \frac{4}{5} \frac{1}{2} = 0.24$$

The likelihood function is

$$\begin{aligned} L(\theta) &= \left[\theta^{-1} e^{-350/\theta} \right]^2 \left[\theta^{-1} e^{-500/\theta} \right]^2 e^{-500/\theta} \theta^{-1} e^{-1000/\theta} \left[e^{-1000/\theta} \right]^2 \theta^{-1} e^{-1200/\theta} \theta^{-1} e^{-1500/\theta} \\ &= \theta^{-7} e^{-7900/\theta} \end{aligned}$$

$$l(\theta) = -7 \ln \theta - \frac{7900}{\theta}; l'(\theta) = -\frac{7}{\theta} + \frac{7900}{\theta^2} = 0; \hat{\theta} = 7900/7$$

$$\hat{S}_2(1250) = e^{-1250(7)/7900} = 0.33$$

The absolute difference is 0.09.