

ANSWERS TO EXAM IN STATISTICAL METHODS,
732A49, 2014-12-17

1) a) $f(y|\alpha, \beta) \geq 0 \quad \int_{\beta}^{\infty} f(y|\alpha, \beta) dy = 1$

b) $F(y) = \begin{cases} 0 & \text{if } y \leq \beta \\ \int_{\beta}^y f(v|\alpha, \beta) dv = 1 - e^{-\frac{-(y-\beta)}{\alpha}} & \text{if } \beta < y < \infty \end{cases}$

c) $P(\beta + 1 < Y \leq \beta + 2) = \int_{\beta+1}^{\beta+2} f(y|2, \beta) dy = e^{-\frac{1}{2}} - e^{-1} \approx 0,239$

2) a) $k=0,5$

b)

3) $Y =$ number of stressed employees among 40 employees.

$Y \sim \text{bin}(40, p)$

a) $\hat{p} = \frac{y}{40} = 0,2$

b) $\hat{p} = \frac{y}{40} = 0,2$

c) $E[p|y = 8] = \frac{10}{46} \approx 0,217$ posterior $\sim \text{beta}(y + 2, 44 - y)$

d) $z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}} \approx 0,885$ Compare with $z = 1,28 \Rightarrow$ Do not reject H_0

4) a) $\hat{\beta}_0 = 1,77 \quad \hat{\beta}_1 = 0,268$

b) $t = \frac{\hat{\beta}_1}{\sqrt{\frac{MSE}{SS_{xx}}}} = \frac{0,268}{\sqrt{\frac{0,00043/5}{2,827}}} = 48,6$ Compare with $t_{0,025}(5) = 2,571 \Rightarrow$ Reject H_0