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

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

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

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.

$Y \sim bin(40, p)$

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$\sim beta(y + 2, 44 - y)$

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

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

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 $t_{0{,}025}(5) = 2{,}571 \implies$ Reject $H_0$