

$$A6) a) \int_0^1 u_0 x^4 dx = u_0 \cdot \frac{1}{5} x^5 \Big|_0^1 = \frac{u_0}{5} \stackrel{!}{=} 1 \Rightarrow u_0 = 5, \text{ und } u_1 = 7$$

III.

$$b) \frac{7}{5} x^2 > u, \text{ wo } u = u(d); P_0 \left[\frac{7}{5} X^2 > u(d) \right] = d$$

$$\uparrow$$

$$P_0 [X^2 > u'] = 0.05 \Leftrightarrow P_0 [X > u''] = 0.05$$

~~Handwritten scribbles~~

$$\int_{u''}^1 u_0 x^4 dx = 0.05$$

$$x^5 \Big|_{u''}^1 = 0.05 \Leftrightarrow 1 - (u'')^5 = 0.05$$

$$\Leftrightarrow u'' = \sqrt[5]{0.95} = 0.9898$$

$$x_1 \begin{cases} > 0.9898 \Rightarrow H_1 \\ \leq 0.9898 \Rightarrow H_0 \end{cases}$$

$$c) \beta = P_1 [X_1 < 0.9898] = \int_0^{0.9898} u_1 x^6 dx = 0.9898^7 = 93.07\%$$

d) H_0 beibehalten (annehmen)

$$e) P_0 [X > 0.7] = 1 - \int_0^{0.7} u_0 x^4 dx = 1 - (0.7)^5 = 83.14\%$$

A7) ~~Handwritten scribbles~~

$$E_p \left[\frac{1}{n} \sum_{i=1}^n X_i \right] = \frac{1}{n} \sum_{i=1}^n E_p [X_i] = \frac{1}{p} = \theta \quad \forall p \in (0,1)$$

~~Handwritten scribbles and notes~~