III.

5) $(X_i)_{i=1}^{10} \sim \mathcal{N}(0,\sigma^2)$

$H_0: \mu = 0$

$H_1: \mu > 0$

$\alpha = 5\%$

$n = 10$

$\bar{X} = 0.4$

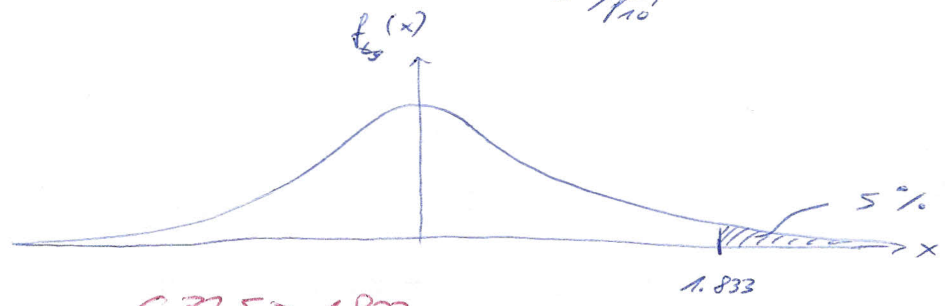
$\hat{\sigma} = 0.2$

1

falls N statt t aber alles richtig: 1.5 P.

10 : 1/2

t-Test: $T_9 := \frac{\bar{X}}{\hat{\sigma}/\sqrt{10}} \doteq \cancel{0.631}$ 6.325 1



6.325 > 1.833

~~0.63 < 1.831~~ $\Rightarrow H_0$ ~~annehmen~~ ablehnen! 1

3

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6) $n = 3$

$p = \frac{1}{365}$ (unter H_0)

$H_0: p = \frac{1}{365}$

H_1: $p = 0.9$

1.5

Test: H_0 ablehnen, wenn $\sum_{i=1}^{3} x_i \geq 2$; wo $X_i \sim Be(p)$

1

$$\underline{\alpha} = P_0\Big[\underbrace{\sum_{i=1}^{3} X_i}_{Bin(3,\,1/365)} \geq 2\Big] = \binom{3}{2}\left(\frac{1}{365}\right)^2 \cdot \left(\frac{364}{365}\right)^1 + \binom{3}{3}\left(\frac{1}{365}\right)^3$$

$$= 2.246 \cdot 10^{-5} + 2.056 \cdot 10^{-8}$$

$$\doteq \underline{\underline{2.248 \cdot 10^{-5}}} \quad (= 0.00002248)$$

1/2

3

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7) $\cdot\, Y := \max\{X_i \mid 1 \leq i \leq n\}$; $a \in [0,\theta]$; $P[Y \leq a] = P[X_1 \leq a, X_2 \leq a, \ldots, X_n \leq a] = \left(\frac{a}{\theta}\right)^n$

$\cdot\, f_Y(a) = \frac{d}{da} F_Y(a) = \frac{1}{\theta^n} \cdot n a^{n-1}$ 1

$\cdot\, \underline{E\left[\frac{n+1}{n} Y\right]} = \int_0^\theta \frac{n+1}{n} x \frac{1}{\theta^n} n x^{n-1} \, dx = \int_0^\theta (n+1) \frac{1}{\theta^n} x^n \, dx = \frac{n+1}{\theta^n} \cdot \frac{1}{n+1} \theta^{n+1} = \underline{\underline{\theta}}$

1 1

3