Christian-Albrechts-Universität zu Kiel **Winter term 2015/16**
Mathematisches Seminar
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In-tutorial exercise sheet 11

supporting the lecture Mathematical Statistics

(Discussion in the tutorial on 3. February 2015)

We consider the situation from in-tutorial exercise sheet 9. Let $X_1, \ldots, X_n$ be iid $Bin(1, p)$ distributed. We want to test the hypotheses

$$H \ : \ p \leq p_0 \quad \text{versus} \quad K \ : \ p > p_0,$$

for $p_0 \in (0, 1)$.

a) Proof that the sequence of tests for $\alpha \in (0, 1)$ derived using the normal approximation

$$\varphi_n(x) = 1 \Leftrightarrow \overline{x}_n > p_0 + \frac{\sqrt{p_0(1-p_0)}}{\sqrt{n}} u_{1-\alpha},$$

where u_α denotes the α quantile of the standardnormal distriution, has asymptotic level α.

b) Proof that the sequence of tests (φ_n) is consistent.