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Homework 3: Introduction to

7. Quiz: Composite Hypotheses for

Course > Unit 2 Foundation of Inference > Hypothesis Testing

> Bernoulli models

Currently enrolled in **Audit Track** (expires December 25, 2019) <u>Upgrade (\$300)</u>

7. Quiz: Composite Hypotheses for Bernoulli models

(a)

1/1 point (graded)

Let X_1,\ldots,X_n be i.i.d. **Bernoulli** random variables with unknown parameter $p\in(0,1)$.

Find a function $T_{n,p}(\overline{X}_n)$, which depends on $\overline{X}_n, n,$ and p , such that

$$T_{n,p}\left(\overline{X}_{n}
ight) \stackrel{ ext{(d)}}{ \underset{n o \infty}{\longrightarrow}} \mathcal{N}\left(0,1
ight),$$

by

- ullet using the Central Limit Theorem on \overline{X}_n and
- ullet substituting any occurrence of $\,p\,$ in the variance by a plug-in estimator for $\,p\,$.

Note: If $T_{n,p} \xrightarrow{\mathrm{(d)}} \mathcal{N}\left(0,1\right)$, then so does $-T_{n,p}$. For this problem and the next part, use the expression for $T_{n,p}\left(\overline{X}_n\right)$ that is of the form $T_{n,p}\left(\overline{X}_n\right)$ where $T_{n,p}\left(\overline{X}_n\right)$ is always **positive**. (Or very loosely speaking, use $T_{n,p}\left(\overline{X}_n\right)$ and not $T_{n,p}\left(\overline{X}_n\right)$ where applicable.)

(Enter **barX_n** for \overline{X}_n).

 $T_{n,p}\left(\overline{X}_{n}
ight) = \boxed{ ext{ sqrt(n)*(barX_n-p)/sqrt(barX_n*(1-barX_n))}}$

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STANDARD NOTATION

Submit

You have used 2 of 3 attempts

✓ Correct (1/1 point)

(b)

3/3 points (graded)

(This is a quiz, hence only 1 attempt.)

Select a test with asymptotic level α , in terms of the function $T_{n,p}\left(\overline{X}_n\right)$, for each of the following pairs of hypotheses: (Choose one for each column. Note the absolute values in the first 2 rows.)

 $H_0: p = 0.5 \quad ext{vs} \quad H_1: p
eq 0.5 \quad : \quad H_0: p \leq 0.5 \quad ext{vs} \quad H_1: p > 0.5 \quad : \quad H_0: p \geq 0.5 \quad ext{vs} \quad H_1: p < 0.5 \quad :$

Generating Speech Output

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Submit

You have used 1 of 1 attempt

✓ Correct (3/3 points)

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? Why make the variance dependent on the estimator? 3

Not sure if I understand the correct answer format for part a does the expression involve ¹>s?

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