

whole syllabus.

estimator  $\rightarrow$  unbiased estimator  $E(T(X)) = \theta$

large  $n$ ,  $\xrightarrow{P}$  conv. in prob,  $\xrightarrow{d}$  conv. in dist, (def) &

WLLN, Cheb meq., Markov. meq., CMT

$S_{n-1}^2 \xrightarrow{P} \sigma^2$ ,  $S_n^2 \xrightarrow{P} \sigma^2$ ,  $S_{n-1} \xrightarrow{P} \sigma$ ,  $S_n \xrightarrow{P} \sigma$

classical CLT, Levy CLT (全部 6 ↑, only cover 2.)

use CLT to construct CI for  $\mu, \sigma^2$ , pivotal quantity, fully specified.

|        | $X \sim N$ | $\sigma^2$ known | result |                |
|--------|------------|------------------|--------|----------------|
| cases: | ✓          | ✓                | .      | slutsky's thm. |
|        | ✓          | X                | .      |                |
|        | X          | ✓                | .      |                |
|        | X          | X                | .      |                |

1<sup>st</sup> delta method for  $g(\theta)$ , using Taylor expansion.

2<sup>nd</sup> ... n<sup>th</sup> delta method.

estimate CI for  $\sigma^2$

$\hat{\theta}(X)$  MME, large  $n$  prop. for multi var MME., invariance prop.

MLE.  $\hat{\theta}(X)$ , 2 para case, invariance prop.  $\hat{\theta}$  then  $h(\hat{\theta})$  is

Fisher info.  $I_X(\theta)$ , matrix. (2 para), regularity conditions & lemmas.  
asy MLE., observed fisher info.

UMVUE, CRLB for  $\theta$  and  $g(\theta)$ , linear trans.

Bootstrap & find CI. | hypo testing