Sampling distribution and standard Error

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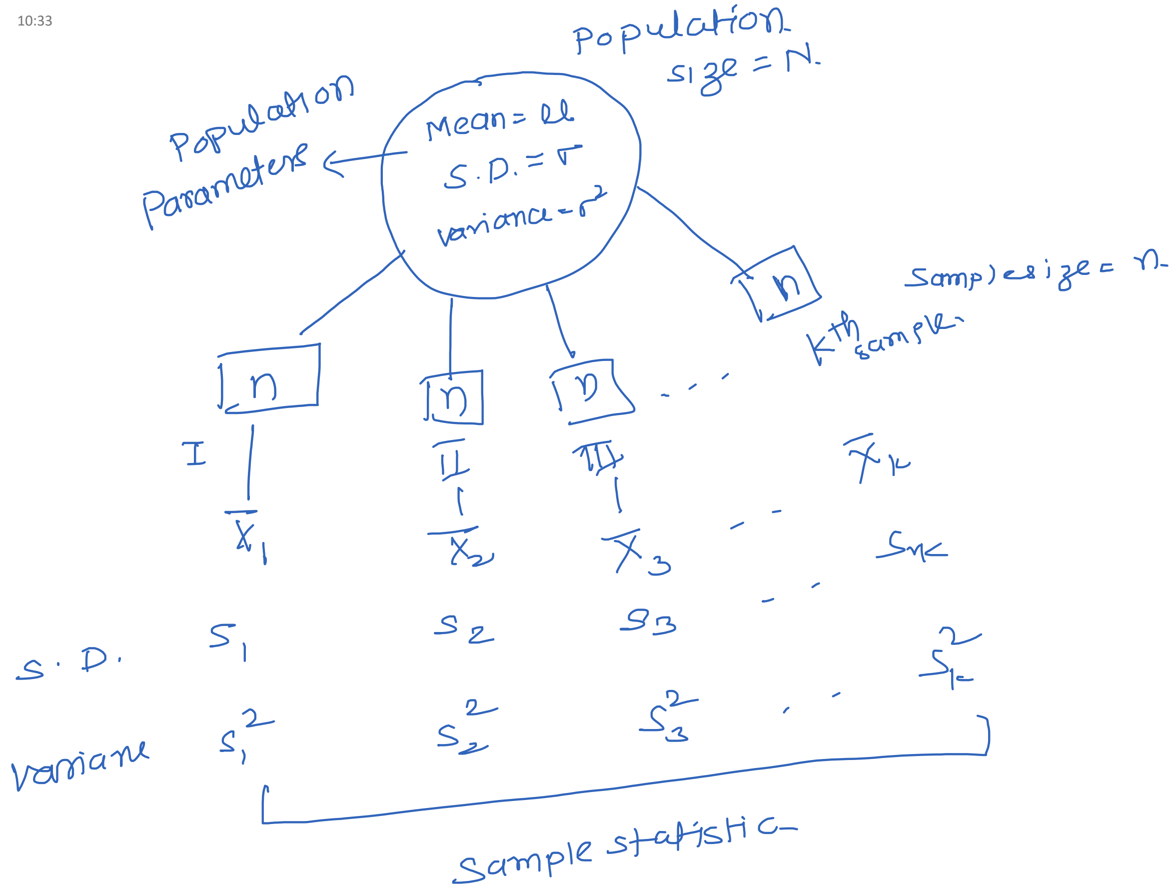

Sample Mean	probability of sample mean
$\bar{x}_1$	$p(\bar{x}_1)$
$\bar{x}_2$	$p(\bar{x}_2)$
$\vdots$	$\vdots$
$\bar{x}_k$	$p(\bar{x}_k)$

t

sampling distribution of mean

S.D.	probability S.D.
s_1	$p(s_1)$
s_2	$p(s_2)$
$\vdots$	$\vdots$
s_k	$p(s_k)$

← sampling distribution of S.D.

SK	PCSK

standard Error

Defn: standard deviation of sampling distribution of a statistic is known as standard error.

S.E is different for every distribution.

statistic	standard error
1) sample mean, $\bar{x}$	$\frac{\sigma}{\sqrt{n}}$ $\sigma \rightarrow$ S.D. of population, $n \rightarrow$ sample size
2) sample S.D. S	$\sqrt{\frac{\sigma^2}{2n}}$
3) sample variance s^2	$\sigma^2\sqrt{2/n}$
4) p is population proportion and $q = 1-p$	

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n_1 & n_2 sizes of two independent random samples.

sample proportion p $\sqrt{pq/n}$.

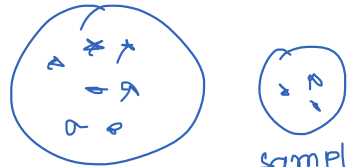
5) difference of two sample means $(\bar{x}_1 - \bar{x}_2)$ $\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}$

6] difference of two sample s.d. $(s_1 - s_2)$ $\qquad \sqrt{\frac{\sigma_1^2}{2n_1} + \frac{\sigma_2^2}{2n_2}}$

Sampling with and without Replacement

population size $= N$

sample size $= n$



population sample

① sampling with replacement

p size $= N$. sample $= n$

total no. of samples: $= N^n$.

② without replacement :-

Total no of samples : $^N C_n$

for example: $N = 4$, $n = 2$.

With replacements

Total no of possible sample of size 2.

$= 4^2 = 16$

4 3

7 11

without replacement

Total no of possible samples of size 2.

$^4C_2 = \frac{4!}{2!\,2!} = 6$

possible samples without replacement $= 6$.

$N = 4$.

$n = 2$

possible sampl

$N = 4.$
Q $n = 2$
$4^2 = 16$

3 7
4 11

Sample values
3, 7 | 4, 4
3, 4 | 4, 7
3, 11 | 4, 11
3, 3 | 4, 3
7, 7 | 11, 11
7, 3 | 11, 4
7, 4 | 11, 3
7, 11 | 11, 7

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Statistical Inference

Hypothesis testing
Unit I & VI

Estimation