

BOOT STRAP

STAT 432

SPRING 2020

DALPIAZ

POPULATION DISTRIBUTION

$$X_1, X_2, \dots, X_n \sim P(x | \theta) \quad \text{RANDOM VARIABLES}$$

x_1, x_2, \dots, x_n

(POTENTIAL) REALIZED VALUES

2.1, 1.3, \dots, 3.4

REALIZED VALUES

θ

PARAMETER

$\hat{\theta}$

ESTIMATOR

$\hat{\theta}$

DISTRIBUTION ?

USE FOR INTERVAL ESTIMATE

WHAT IF $p(x|\theta)$ IS UNKNOWN?

↳ ESTIMATE IT! THEN SIMULATE!

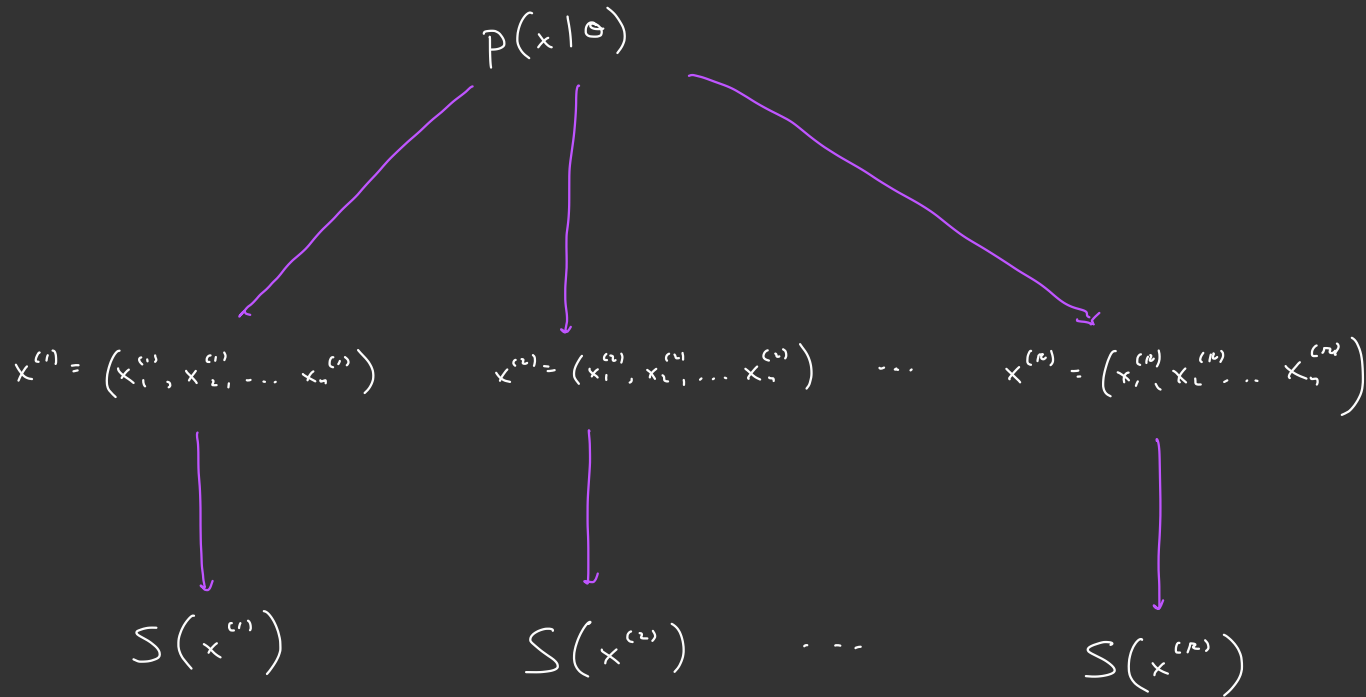
BOOTSTRAP RESAMPLE

- A SAMPLE OF SIZE n WITH REPLACEMENT FROM THE ORIGINAL SAMPLE.
 - SAME AS A RANDOM SAMPLE OF SIZE n FROM EDF

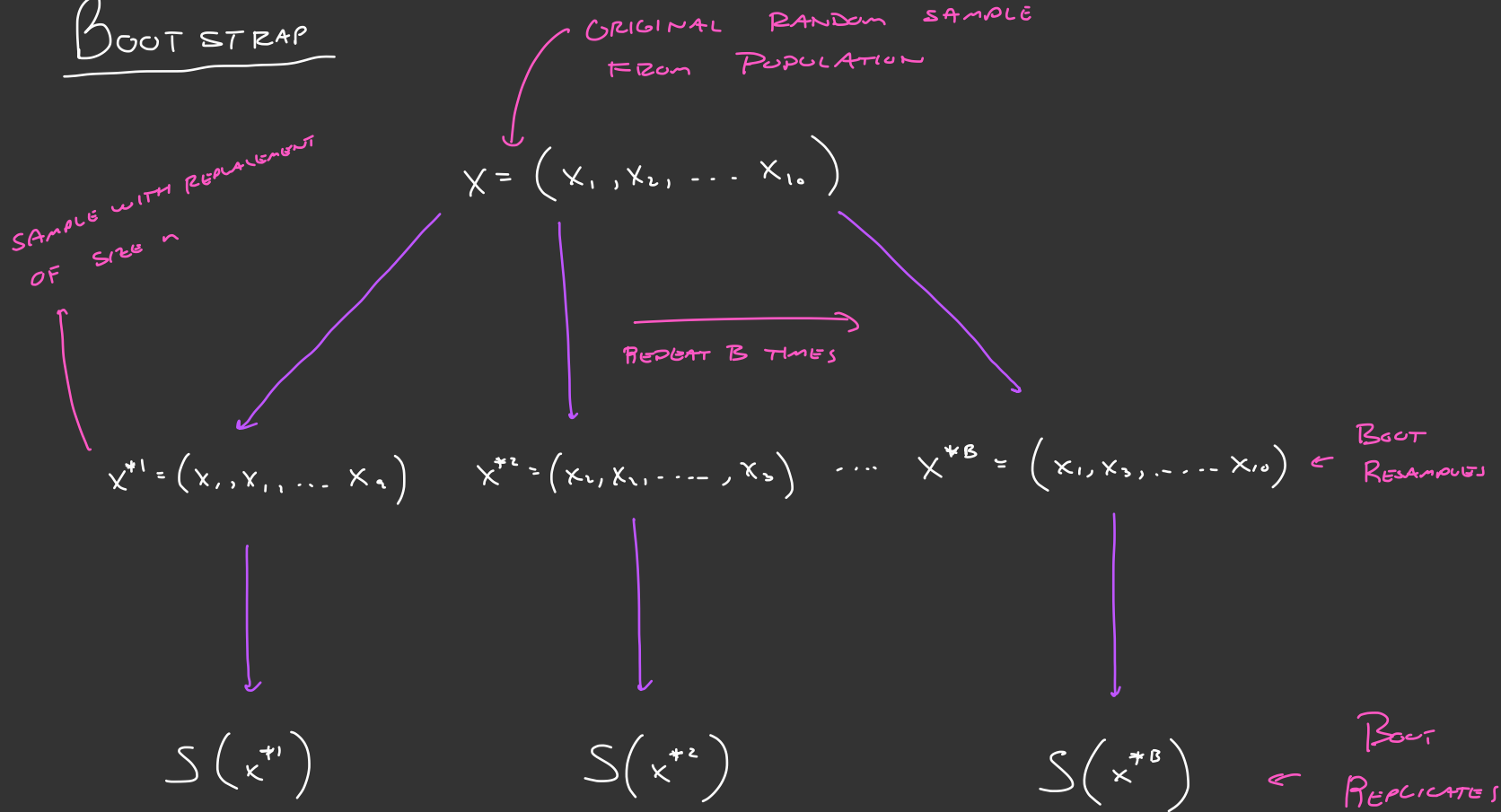
BOOTSTRAP REPLICATE

- A STATISTIC CALCULATED ON A BOOTSTRAP RESAMPLE

SIMULATION



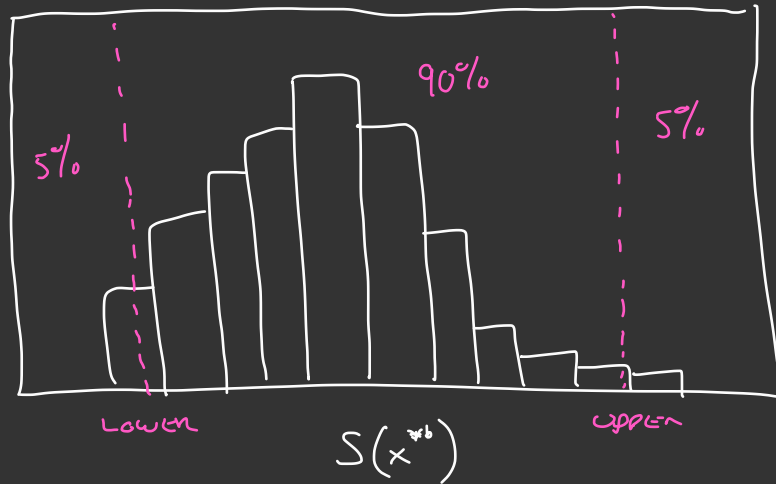
BOOTSTRAP



BOOTSTRAP CONFIDENCE INTERVAL

(PERCENTILE METHOD)

HISTOGRAM OF BOOT REPS



90% CI