Null hypotesis, Ho - NOTHING GOING ON

Alterdie ", HI - SOMETHING EXTRA GOING ON

E;

Ho: P(T) = 1/2 (FAIR COIN) T= Tails

Ha: P(F) Z (UNFAIR COIN) TEST STATISTIC -

y = observed - expected

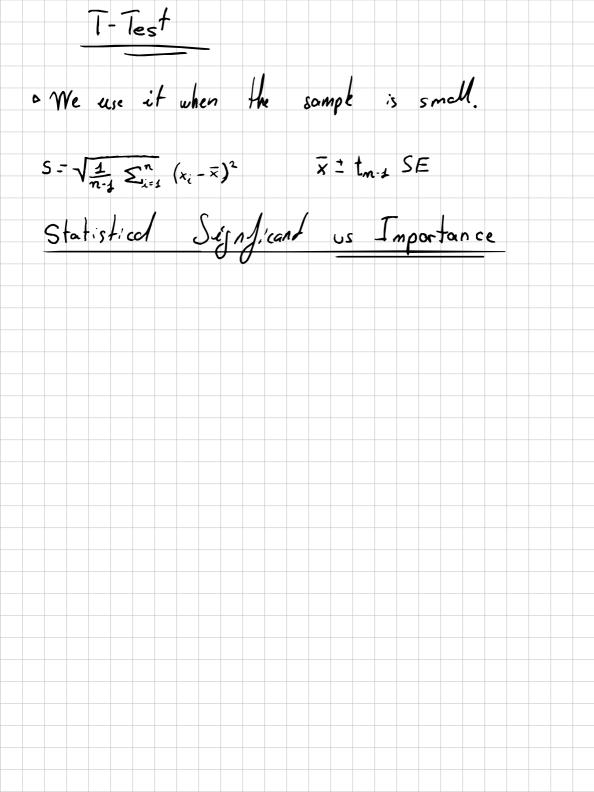
Wester : 10 . \frac{1}{2} = 5 \SE = \frac{10}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = 1.58

$$2 = \frac{7-5}{1.58} = 1.27$$

P-Values as Measures of Evidence large value, of | Z | are evidence egainst Ho The strength of the endence is the p-value (observed significance level) do, volere de por desgo del SO se scalen consideror "slelvelly synfunt"

z = observsk-capale

SE If pouls is larger than 5% we will not reject the null hypotesis.



TWO SLUPLE 2-TEST Rating: Ps -0 n=1000 & 55% P2 -> n=1500 & 58% Ho -> Px = P2 (nothing invol coming up) 1 = SE of ofference $\hat{\rho}_{1} = 55\%$ $\rho_{2} - \rho_{2} = 0$ ρ̂2 = 58% (0.58-0.55)-0-1.48 O. 0202 /M:romo)
Toble p-value = 2 (7%) $\sqrt{\frac{\rho_{3} (1-\rho_{3})^{2}}{n_{3}}} + \sqrt{\frac{\rho_{2} (1-\rho_{3})}{n_{3}}}$ ryed mull by poless Also confidence interest (\hat{\hat{\rho}_2 - \hat{\rho}_2) = \times SE(\hat{\rho}_2 - \hat{\rho}_2) 10 co. d 98% 2=2 [-12, 72]

0.55. 1000 = \$\$0] = \$(420 at of 2500)

0.58-1500 = \$\$0] = \$(420 at of 2500)

path at
$$\frac{1470}{2500} = 56.8$$

$$\mathcal{E}(\hat{A} - \hat{P}_{A}) = \frac{0.568}{1000} \frac{(1-0.568)}{1000} + \frac{0.568(1-0.568)}{1500} = 0.0207

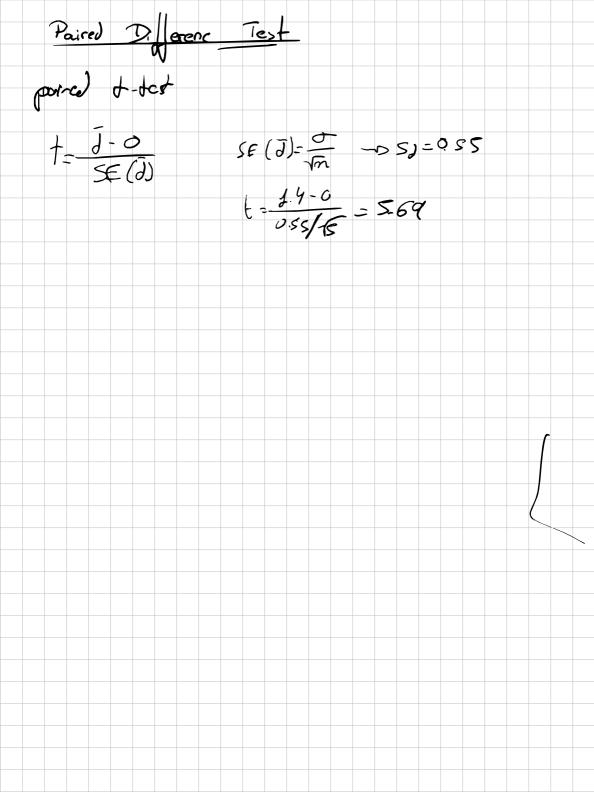
while guy the sec give $\frac{1}{1000}$

$$SE(\hat{A} - \hat{P}_{A}) = \sqrt{(56(2))^{2} + (56(2))^{2}}$$

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$$SE(\hat{A} - \hat{A}_{A}) = \frac{0.568}{1000} \frac{1}{1000} \frac{1}{1000} \frac{1}{1000}$$

$$SE(\hat{A} - \hat{A}_{A}) = \sqrt{(56(2))^{2} + (56(2))^{2}}$$$$



COMPUTER SIMULATIONS IN PLACE OF CALCULATIONS Recoll - confidence interval (x ± 25E(x) estimator for example of for a parameter of and the mormal approximation is not which for that estimator ô En edes studiones las simulaciones pueden ser usados poura estimor

JAW OF LARGE NUMBERS TO APPROXIMATE QUANTITIES OF INTEREST Monte Carlo Method For the explanation we will use the average height of people living in USA Sample n = 100 We are interested in a parameter O of a population that we estimate with ô Our sklydic (estimeter) à is the acrege so $\hat{\theta} = \text{average of sample} = \frac{1}{n} \sum_{i=1}^{n} x_i$ Monte Carlo Method or Simulation: Approximation to a fired quantity of by the average of independent rondom wow. She with expected whe Seen O. the larger the so-ple He soller Me SE of the Statistic SE (B) = VE (B-E(B))2

Example: 1 1000 samples of 100 observations 2. Compute ô for the sample, Ô2... Ô2000 3. Compute Standard Dev $S(\hat{\theta}_{1}...\hat{\theta}_{1000}) = \sqrt{\frac{1}{1000-1}} \sum_{i=1}^{1000} (\hat{\theta}_{i}...average(\hat{\theta}_{i}))^{2}$ ô = awerage (ô) Sumory D Random Sampling o the more Sample, the less SE o We can compute the SE with it

Plug-In Bootstrap principle The bookstrap principle uses the ply-in principle and the montecorlo method to aproximate quantities such as SE(Ô) 1. Draw sample Xx ... Xn to compute & 2. Repeat B +1-0 (Fy B=1000) to set @ ... OB If we have only I sample then the bootstrop sindele from He sople since we do-h Boxally it island with the sample like if the so-ple - as the population

Non-parametic bootstrap Sometimes we can known or supose characteristics of the Oda. For example we might known that it Joklows a normal distribution but not its SE or mean BOOTSTRAP COWFIDENCE INTERVALS ô + 2 SE (ô) We can estimate the sampling distibles

Making a histogram of the bookstrop copres Also we con de 9-0 backstrap pivoled interval $\left[2\hat{\theta}-\hat{\theta}_{(1-\alpha/2)}^{*},2\hat{\theta}-\hat{0}_{(\alpha/2)}^{*}\right]$

Bootstraping in regression

We have data (X, Y), ..., (Xn, Yn) from simple linear regresion model Y: = a + b X: + e; From the data we can compute estimates And Compule residuds: ê; = Y; - â - b X; Memember: residuels are the difference between

He absorred values and the rules preducted

by the model/regression line Residud = observed - predicted 1. Compute residuels ê; = Yi - à - b Xi 2. Resomple from those residels to get ex. ... en 3. Compute the bookstrap responses Y; = a+bXi+ei