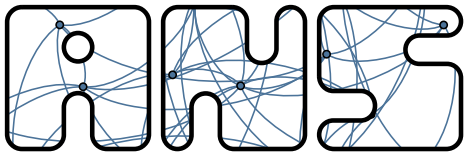

UNIVERSITY OF TRENTO
Department of Information Engineering and Computer Science

Assignment 1
Estimation of a Population Parameters

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Simulation and Performance Evaluation 2016-17

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- Probe at 20 kHz of the output of an electronic circuit, you can imagine its output power, a tension, but it's immaterial wrt our analysis
- The measure lasts 3 s, so there are 60,000 samples to analyze
- The population (characteristic to be measured) has a Logistic distribution with parameters μ and s:

$$f_Y(y) = \frac{e^{-\frac{y-\mu}{s}}}{s(1+e^{-\frac{y-\mu}{s}})^2}$$

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- The probe is affected by noise and it also introduces a sinusoidal bias
- The actual measured samples can be described as

$$x_i = A\sin(2\pi ft) + Y + Z \quad ; \quad i = 1, \ldots 60,000$$

- X is Gaussian noise with zero mean and σ_n; Z is our population sample
- Our goal is to find estimates of A, f, μ, s, σ_n and to evaluate the confidence interval of $\hat{\mu}$

Procedure

- What do you estimate before hand?
- And next?
- How do you manipulate the data to proceed?
- When you are left with only Y and Z to estimate what do you do?