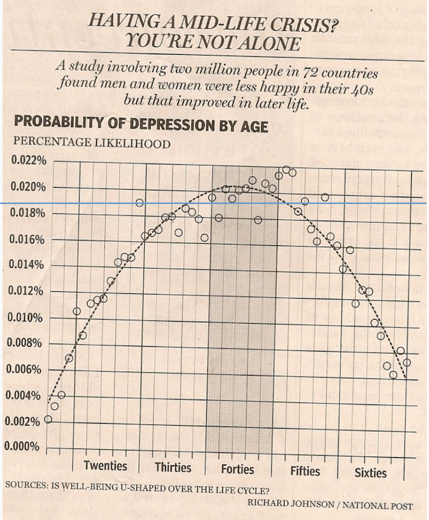
Mathematical Statistics II

STA2212H S LEC9101

Week 1

January 15 2021



Today

1. Course Space – Amar
2. Non-regular distributions
3. HW3 from MS I

Likelihood and Estimation in SM: §4.1 – 4.4; 7.1.1

Likelihood Inference in EH: §4.1,2; 5.1,2,3,5

Office Hours: Monday 7 pm; Thursday, Friday 11 am

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Calculating maximum likelihood estimators

Newton-Raphson

EM-algorithm

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Problem 4 - EXTRA CREDIT

Let $X_1, \ldots, X_n \sim \text{Pareto}(\theta, \nu)$ be iid. The Pareto distribution is commonly used in social and actuarial science. The density is given by

$$f(x|\theta, \nu) = \frac{\theta \nu^\theta}{x^{\theta+1}}, x \geq \nu, \theta > 0, \nu > 0$$

where ν is the scale parameter and θ is the shape parameter. We will assume that ν is fixed throughout the problem.

(a) 5 pts

Find the method of moments estimator $\hat{\theta}_{MOM}$ for θ. Note that for $X \sim \text{Pareto}(\theta, \nu)$,

$$E(X) = \frac{\theta \times \nu}{\theta - 1}.$$

(b) 5 pts

Find the MLE $\hat{\theta}_{MLE}$ for θ.