

18.443. Pset 2.

(1) Use first and second moments in the method of moments to find an estimate of θ in the uniform distribution $U[0, \theta]$ with p.d.f.

$$f(x|\theta) = \begin{cases} \frac{1}{\theta}, & \text{when } 0 \leq x \leq \theta, \\ 0, & \text{otherwise,} \end{cases}$$

where $0 < \theta < \infty$. Compare these two estimates by computing their asymptotic variances.

- (2) Find MLE of the parameter λ for Poisson distribution $\Pi(\lambda)$.
- (3) Find MLE of the parameter α for exponential distribution $E(\alpha)$.
- (4) Consider a parametric family of distributions with the p.d.f. given by

$$f(x|\theta) = \begin{cases} e^{\theta-x}, & \text{when } x \geq \theta, \\ 0, & \text{when } x < \theta, \end{cases}$$

and where $-\infty < \theta < \infty$. Find MLE of θ for this family.

- (5) Consider a parametric family of distributions with the p.d.f. given by

$$f(x|\theta) = \frac{1}{2}e^{-|x-\theta|} \text{ for } -\infty < x < \infty,$$

where $-\infty < \theta < \infty$. Find MLE of θ for this family. (Hint: see Theorem 4.5.1 in the book.)