**ASSIGNMENT I**

CENTRAL LIMIT THEOREM

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CENTRAL LIMIT THEOREM

Let *X*1, *X*2, ..., *Xn*be a random sample from a distribution (*any distribution*!) with (finite) mean *μ* and (finite) variance *σ*2. If the sample size *n* is "sufficiently large," then:

* The sample mean X¯ follows an approximate normal distribution
* With mean E(X¯) = μ X¯ =μ
* And variance Var(X¯) = σ2 X¯=σ2 n

We write:

or:

**OBSERVATIONS FOR DIFFERENT DISTRIBUTIONS**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Distribution | Concerned Statistics | Sample size for which it converges to Normal | | | | | | | |
| Uniform (0,1) | Mean |  | | |  | | |  | |
| Median |  | | |  | | |  | |
| Standard deviation |  | | |  | | |  | |
| Minimums |  | | |  | | |  | |
| Maximums |  | | |  | | |  | |
| IQR |  | | |  | | |  | |
|  |  |  | | | | | | | |
| Distribution | Concerned Statistics | Sample size for different parameter (n, p) for which it converges to Normal | | | | | | | |
| (12,0.001) | | | (20,0.05) | | | (18,0.95) | |
| Binomial (n, p) | Mean |  | | |  | | |  | |
| Median |  | | |  | | |  | |
| Standard deviation |  | | |  | | |  | |
| Minimum |  | | |  | | |  | |
| Maximum |  | | |  | | |  | |
| IQR |  | | |  | | |  | |
|  |  |  | | | | | | | |
| Distribution | Concerned Statistics | Sample size for different parameter (n, p) for which it converges to Normal | | | | | | | |
| (12,0.01) | | | (20,0.05) | | | (18,0.95) | |
| Binomial (n, p) | Mean |  | | |  | | |  | |
| Median |  | | |  | | |  | |
| Standard deviation |  | | |  | | |  | |
| Minimum |  | | |  | | |  | |
| Maximum |  | | |  | | |  | |
| IQR |  | | |  | | |  | |
|  |  |  | | |  | | |  | |
| Distribution | Concerned Statistics | Sample size for different parameter ((λ) for which it converges to Normal | | | | | | | |
| 0.001 | | | 1 | | | 25 | |
| Poisson (λ) | Mean |  | | |  | | |  | |
| Median |  | | |  | | |  | |
| Standard deviation |  | | |  | | |  | |
| Minimum |  | | |  | | |  | |
| Maximum |  | | |  | | |  | |
| IQR |  | | |  | | |  | |
| Distribution | Concerned Statistics | Sample size for different parameter ((λ) for which it converges to Normal | | | | | | | |
| 0.001 | | | 1 | | | 25 | |
| Exponential (λ) | Mean |  | | |  | | |  | |
| Median |  | | |  | | |  | |
| Standard deviation |  | | |  | | |  | |
| Minimum |  | | |  | | |  | |
| Maximum |  | | |  | | |  | |
| IQR |  | | |  | | |  | |
|  |  |  | | |  | | |  | |
| Distribution | Concerned Statistics | Sample size for different parameter (α,λ)for which it converges to Normal | | | | | | | |
| 0.001,1 | | | 2,1 | | | 30,1 | |
| Gamma (α,λ) | Mean |  | | |  | | |  | |
| Median |  | | |  | | |  | |
| Standard deviation |  | | |  | | |  | |
| Minimum |  | | |  | | |  | |
| Maximum |  | | |  | | |  | |
| IQR |  | | |  | | |  | |
|  |  |  | | |  | | |  | |
| Distribution | Concerned Statistics | Sample size for different parameter (α,β) for which it converges to Normal | | | | | | | |
| 2,2 | 20,2 | 2,8 | | 0.5,0.5 | 0.5,0.2 | | 0.2,5 |
| Beta (α,β) | Mean |  |  |  | |  |  | |  |
| Median |  |  |  | |  |  | |  |
| Standard deviation |  |  |  | |  |  | |  |
| Minimums |  |  |  | |  |  | |  |
| Maximums |  |  |  | |  |  | |  |
| IQR |  |  |  | |  |  | |  |
|  |  |  |  |  | |  |  | |  |
| Distribution | Concerned Statistics | Sample size for which it converges to Normal | | | | | | | |
| Cauchy (0,1) | Mean |  | | | | | | | |
| Median |  | | | | | | | |
| Standard deviation |  | | | | | | | |
| Minimums |  | | | | | | | |
| Maximums |  | | | | | | | |
| IQR |  | | | | | | | |
|  |  |  | | | | | | | |
| Distribution | Concerned Statistics | Sample size for which it converges to Normal | | | | | | | |
| Normal (0,1) | Mean |  | | | | | | | |
| Median |  | | | | | | | |
| Standard deviation |  | | | | | | | |
| Minimum |  | | | | | | | |
| Maximum |  | | | | | | | |
| IQR |  | | | | | | | |









