**A BRIEF STUDY ON**

**MAXIMUM LIKELIHOOD ESTIMATES**

**IN NON-CLOSED FORM**

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In Maximum Likelihood Estimation (MLE), we wish to find that point in parameter space, referred to as the maximum likelihood estimate (mle), which maximises the likelihood function, so that under the assumed statistical model the observed data set is most probable. Even though mle's possess some nice properties, it is not always easy to explicitly determine them. In that regard, it becomes necessary that we implement some numerical methods or simulations, or some combination of those two to have an idea about the mle. We deal with some of those situations in this project, and observe the results.

We first consider some distributions, for which the maximum likelihood estimates (mle) can not be obtained easily or explicitly. Then we implement some suitable numerical method to obtain an estimate of the mle. After that, through the process of simulation, we look at the properties exhibited by the obtained numerical estimate of the mle for varying sample size. For example, the property of unbiasedness may be of our interest. In that context, a question that naturally arises is that whether the variance of that unbiased numerical estimator attains the Fréchet Cramér Rao lower bound or not. We will use the method of nonparametric bootstrapping to find out an estimate of the variance of the unbiased numerical estimator. We will repeat the process for different set of parameters for all the distributions under consideration, so that the study is comprehensive.