

Abstract

Empirical likelihood is a nonparametric method, which does not require any assumption of the underlying distribution, and also enjoys the benefits of a likelihood method. In this project, we will look at how the empirical likelihood approach can be applied to three different problems. First, weights that maximised the empirical likelihood can be used to resample a biased dataset. We then use an empirical likelihood estimation method to make an estimate on the parameter of interest. Three different methods, with different resampling probabilities and estimation equations, are implemented and the results will be compared. Next, we consider a problem constrained by known external population level information. Empirical weights are used to resample a dataset and either a constrained or unconstrained model will be fitted to the resample. An equal probability resampling and constrained approach will also be implemented. In addition, we studied the behaviour of the estimates when a resampling method with probability given by a chi-square(1) distribution is used instead. Lastly, we wish to observe how well the empirical likelihood estimate performs when we apply an empirical likelihood estimation method to a perturbed variable. All the simulation codes used in Chapter 3 to 5 are developed by the author and the simulation results are new.