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Estimation of Prior Density by Numerical Solution of Integral Equations

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ABSTRACT

In the classical approach to estimation of an unknown parameter, the parameter is assumed to be a constant which is estimated on the basis of available data. In Bayesian approach to estimation, the unknown parameter is allowed to be a random variable with a probability distribution of its own, called the prior distribution. The Bayes estimate can be computed if the prior distribution is completely known. If such is not the case, and past samples are available, then the prior distribution can be estimated from the past data and used in place of the prior, yielding empirical Bayes estimates. In this paper, we will discuss a method of estimating the prior distribution on the basis of the current data based on the method of numerical solution of integral equations. Actuarial applications and examples will be provided.