An Application of Sinc Function to Approximate Quadrature Integrals in Generalized Linear Mixed Models

Authors : Altaf H. Khan, Frank Stenger, Mohammed A. Hussein, Reaz A. Chaudhuri, Sameera Asif

Abstract : This paper discusses a novel approach to approximate quadrature integrals that arise in the estimation of likelihood parameters for the generalized linear mixed models (GLMM) as well as Bayesian methodology also requires computation of multidimensional integrals with respect to the posterior distributions in which computation are not only tedious and cumbersome rather in some situations impossible to find solutions because of singularities, irregular domains, etc. An attempt has been made in this work to apply Sinc function based quadrature rules to approximate intractable integrals, as there are several advantages of using Sinc based methods, for example: order of convergence is exponential, works very well in the neighborhood of singularities, in general quite stable and provide high accurate and double precisions estimates. The Sinc function based approach seems to be utilized first time in statistical domain to our knowledge, and it's viability and future scopes have been discussed to apply in the estimation of parameters for GLMM models as well as some other statistical areas.

Keywords : generalized linear mixed model, likelihood parameters, qudarature, Sinc function
Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development
Conference Location : Chicago, United States
Conference Dates : December 12-13, 2020