BAYESIAN ESTIMATION OF BETA-TYPE DISTRIBUTION PARAMETERS BASED ON GROUPED DATA

Kazuhiko Kakamu * Haruhisa Nishino †

Abstract

This study considers the estimation method of generalized beta (GB) distribution parameters based on grouped data from a Bayesian point of view. Because the GB distribution, which was proposed by McDonald and Xu (1995), includes several kinds of familiar distributions as special or limiting cases, it performs at least as well as those special or limiting distributions. Therefore, it is reasonable to estimate the parameters of the GB distribution. However, when the number of groups is small or when the number of parameters increases, it may become difficult to estimate the distribution parameters for grouped data using the existing estimation methods. This study uses a Tailored randomized block Metropolis–Hastings (TaRBMH) algorithm proposed by Chib and Ramamurthy (2010) to estimate the GB distribution parameters, and this method is applied to one simulated and two real datasets. Moreover, the Gini coefficients from the estimated parameters for the GB distribution are examined.

Key words: Generalized beta (GB) distribution; Gini coefficient; grouped data; simulated annealing; Tailored randomized block Metropolis–Hastings (TaRBMH) algorithm.

*Corresponding author. Graduate School of Business Administration, Kobe University, 2-1, Rokkodai, Nada, Kobe 657-8501, Japan. *Email*: kakamu@person.kobe-u.ac.jp

†Faculty of Law, Politics and Economics, Chiba University, Yayoi-cho 1-33, Inage-ku, Chiba 263-8522, Japan. *Email*: nishino@le.chiba-u.ac.jp