SAS/IML FOR PARAMETERS ESTIMATION FOR MULTISTATE HIGHER ORDER COVARIATE DEPENDENT MARKOV MODEL

R.I. Chowdhury[†1], M.A. Islam[2], S. Huda[3]

[1] *FAHS, Kuwait University, Kuwait*
[2] *University of Dhaka, Bangladesh*
[3] *College of Science, Kuwait University, Kuwait*

[†] E-mail: *rafiq@hsc.edu.kw*

Markov model is used to analyze real life data emerging from time series or longitudinal study in various fields for its attractive properties. Islam and Chowdhury (In press, Applied Mathematical Modelling) generalized the estimation procedure for covariate dependent Markov models for higher order using logistic link function proposed by Muenz and Rubinstein [Biometrics 41 (1985), 91101]. In another study, Islam et al., (Submitted) further generalized the model for multiple states and higher order using logistic link functions for demonstrating relationships between transition probabilities and risk factors including the estimation and test procedures. However, for any newly developed statistical methods, the wider applications are restricted, due the unavailability of needed computer programs. As the state and the order of Markov model increase, the number of parameters increases rapidly. Chowdhury et al., (Computer Methods and Programs in Biomedicine, 2005, 77(2):175-181) developed a S-Plus function for binary outcome for higher order covariate dependent Markov model for parameter estimation. However, the use of traditional programming methods and the use of loop significantly increase the time to estimate the parameters for large data sets. In this paper we present a new algorithm and develop a computer program in SAS/IML to estimate the parameters of the models and related tests for any number of states and order. We have generalized the estimation problem in matrix form to avoid loops. The proposed algorithm was tested using a panel data set. Our algorithm has decrease the estimation time significantly. We believe our program will be useful to the researchers who wish to apply the covariate dependent Markov models.