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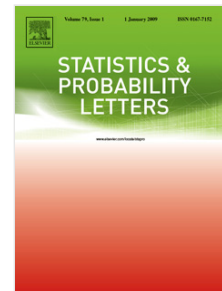
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# Interval Estimation for a Simple Bilinear Model

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**Abstract.** Empirical likelihood methods based on some weighted score equations are proposed for constructing confidence intervals for the coefficient in the simple bilinear model without assuming normality for the errors and without estimating the asymptotic variance explicitly. A simulation study confirms the good finite sample behavior of the proposed methods.

**Keywords:** Bilinear time series; Empirical likelihood; Weighted estimation

## 1 Introduction

As a kind of nonlinear time series models, bilinear models have been widely studied in the literature, see Subba Rao (1981), Pham and Tran (1981), Kim et al. (1990), Basrak et al. (1999) and Giordano (2004), among others. It is well known that the general bilinear models are difficult to deal with because of their complex probabilistic structure. Consider the following simple bilinear time series model

$$X_t = b\epsilon_{t-1}X_{t-2} + \epsilon_t, \quad (1)$$

for  $t = 1, 2, \dots, n$ , where  $\epsilon_t$ 's are independent and identically distributed random variables with zero mean and variance  $\sigma^2$ . As pointed out by Giordano (2000), model (1) is appealing because it looks like a white noise if one considers only the first and second moments and it can be fitted to residuals of some other linear or nonlinear time series models in order to capture, for example, the skewness or kurtosis. In other words, model (1) may be used as a first step tool for building much more complex nonlinear time series models.

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