

# PERFORMANCE OF BILINEAR AUTOREGRESSIVE MOVING AVERAGE MODELS: USING DEMOGRAPHIC TIME SERIES DATA

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## **ABSTRACT**

This paper investigates the performance of bilinear time series autoregressive moving average (ARMA) models i.e. BL (p, o, r, s) and BL (p, q, r, s). The full bilinear model was fitted to monthly data on number of marriages conducted at Addis Ababa City Municipality for 19 years. The estimation of the parameters and residual variance of BL (p, o, r, s) was compared with BL (p, q, r, s). In the series, having considered the best subset autoregressive model AR (p) and the best subset autoregressive moving average model ARMA (p, 1) as our initial values in fitting BL (8, 0, 5, 3) and BL (6, 1, 5,3); it was found out that the residual variance attached to BL (6, 1, 5, 3) was smaller than BL (8, 0, 5, 3) meaning that the bilinear time series with ARMA as the initial value performed better than bilinear time series with AR. The non-linearity of the marriage data used made us compare the performance of the bilinear time series with the linear.

**KEYWORDS:** Bilinear time series model, Yule Walker Equation, Autoregressive model, Moving average model, Autoregressive moving average model.