

## Application of Stochastic Models to Annual Extreme Streamflow Data

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**Abstract :** This study was designed to find the best stochastic model (using of time series analysis) for annual extreme streamflow (peak and maximum streamflow) of Karkheh River at Iran. The Auto-regressive Integrated Moving Average (ARIMA) model used to simulate these series and forecast those in future. For the analysis, annual extreme streamflow data of Jelogir Majin station (above of Karkheh dam reservoir) for the years 1958&ndash;2005 were used. A visual inspection of the time plot gives a little increasing trend; therefore, series is not stationary. The stationarity observed in Auto-Correlation Function (ACF) and Partial Auto-Correlation Function (PACF) plots of annual extreme streamflow was removed using first order differencing ( $d=1$ ) in order to the development of the ARIMA model. Interestingly, the ARIMA(4,1,1) model developed was found to be most suitable for simulating annual extreme streamflow for Karkheh River. The model was found to be appropriate to forecast ten years of annual extreme streamflow and assist decision makers to establish priorities for water demand. The Statistical Analysis System (SAS) and Statistical Package for the Social Sciences (SPSS) codes were used to determinate of the best model for this series.

**Keywords :** stochastic models, ARIMA, extreme streamflow, Karkheh river

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