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Non-linear models of hydrological time series

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Various hydrological time series exhibit nonstationarity and/or nonlinearity, which cannot be properly captured by the often used classical Box Jenkins methodology. More general models than ARMA models are needed to reproduce the statistical properties of such series. Therefore models of the ARCH (Autoregressive Conditional Heteroskedasticity) and GARCH (General Autoregressive Conditional Heteroskedasticity) type, which were shown to be able to describe uncertainties on financial markets and diverse time series in nature are introduced for the modeling hydrological time series. TAR type of models (Threshold Autoregressive), which enable to deal with the switching of regimes during time series generation will also be considered. A selection of these models will be applied to rivers flow data from Slovakia for the study of the properties and the variability of these time series, but also for their simulation and forecasting.