

Detecting hysteresis in psychological processes with the hysteretic threshold autoregressive (HysTAR) model

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Keywords: Hysteresis; Regime Switching; Threshold autoregressive model

The presence of different regimes characterizes many psychopathological phenomena. Switches between these regimes are hysteretic when the “tipping point” of a switch depends on the current regime itself. This implies that a regime switch is not immediately reversible, even when the cause of the switch is reversed. Although this principle is very intuitive and found in wide range of phenomena, applications in the social sciences have been limited because of modeling difficulties associated with differential equation models. The current study introduces the hysteretic threshold autoregressive (HysTAR) model, first proposed in the econometric literature. Inspired by the threshold autoregressive (TAR) model, regime switches are determined by the value of an observed threshold variable. However, unlike in the TAR model, two thresholds are specified, between which the regime will not switch. The current study implements the BAR model in the R package `bar`, with a simulation function and conditional least squares estimation of the model parameters. The model is applied in a small simulation study and an empirical psychopathological example.