Model : Binary Autoregressive-Moving Average Model

This model was firstly suggested by Li (1994) which he called BARMA(p,q)

$$\Pr\left(y_t \middle| \mu_t, y_{t-1}, y_{t-2}, \ldots y_{t-p}\right) = \mu_t$$

$$\mu_t = \frac{e^{\eta_t}}{1 + e^{\eta_t}}$$

$$\eta_t = \beta_0 + \sum_{i=1}^{p} \phi_i y_{t-i} + \sum_{i=1}^{q} \theta_i (y_{t-i} - \mu_{t-i})$$

The log – likelihood is $\quad \mathcal{L} = \sum_{t=1}^{T}(y_t log \mu_t + (1 + y_t) \log(1 - \mu_t))$