

ID10

ARARMA(X)

Identification



10.2 OPTIMAL ARARMAX PREDICTORS

The expression of the optimal ARARMAX predictor can be obtained from (10.1.3) imposing a prediction error $y(t) - y(t|t-1)$ equal to $w(t)$; we obtain

$$\begin{aligned} y(t|t-1) &= (r(z^{-1}) - s(z^{-1})q(z^{-1}))y(t) + s(z^{-1})p(z^{-1})u(t) \\ &\quad + (1 - r(z^{-1}))y(t|t-1) \\ &= (r(z^{-1}) - q^*(z^{-1}))y(t) + p^*(z^{-1})u(t) + (1 - r(z^{-1}))y(t|t-1). \end{aligned} \quad (10.2.1)$$

An equivalent expression is given by

$$z^{n_\delta} r(z) y(t|t-1) = (z^{n_\delta} r(z) - q^*(z))y(t) + p^*(z)u(t). \quad (10.2.2)$$

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