

Identification of a multivariable delta-operator stochastic state-space model with distributed time delays

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A high sampling frequency is often required to monitor and control real processes. However, a high sampling frequency increases the uncertainty of the identified shift-operator discrete-time model due to the truncation error and also raises the model order by increasing the number of delay steps. This study has addressed the above two points and proposed a method to identify a compact delta-operator-based stochastic state-space model for a multiple-input multiple-output system with distributed time delays. The proposed method was applied to numerical processes to illustrate its performance and also to identify a 12-inch rapid thermal processing unit.