

Estimation of ARX Model with Uniform Noise - Algorithms and Examples

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Abstract:

Autoregressive model with exogenous inputs (ARX) is a widely used black-box type model underlying adaptive predictors and controllers. The output noise is usually supposed to have the Gaussian distribution with zero mean value.

These models are good algorithmically processed, they have a wide range of exploitation and their usage give reasonable results. Light tails of the normal distribution imply that its unbounded support can often be accepted as a reasonable approximation of reality, which is mostly bounded.

In some cases, however, this assumption is unrealistic or do not fit a subsequent processing. Then, techniques dealing with unknown-but-bounded equation errors are used. In the paper the output noise is assumed to have the uniform distribution.

The posterior probability density function (pdf) of this model is described by the system of the inequalities. The number of these inequalities is increasing with the number of processed data. To obtain recursively feasible approximate estimation of uniform ARX model we have to approximate the exact posterior pdf by a pdf determined by a statistic whose finite dimension does not increase with the increasing number of data.

The algorithmic solution of this problem is presented in this contribution and some illustrative examples are given.

References

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