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System identification of Hammerstein models by using backward shift algorithm. (English)
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Summary: In this paper, a new identification method for discrete-time Hammerstein systems is proposed. The method is a joint use of discrete Fourier transform, backward shift method, and the least squares method. The frequency responses are obtained with sampled input and output data in the time domain through discrete Fourier transform. It is followed by the backward shift algorithm that was originally developed for estimating poles of linear time-invariant systems. After poles of linear subsystem are estimated, coefficients of linear and nonlinear subsystems are respectively determined by using the least squares (LS) method. The robustness of the backward shift algorithm guarantees the effectiveness of the proposed algorithm. Simulation results show that the poles of linear subsystem are well located. Thus, it is practical to identify discrete Hammerstein systems.

MSC:
93Exx Stochastic systems and control
93Cxx Model systems in control theory
93Bxx Controllability, observability, and system structure

Keywords:
nonlinear system; backward shift; Hammerstein system; system identification; transfer function

Full Text: DOI

References:
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