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中国科学院数学与系统科学研究院  
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## 基于时变阈值的二值有限脉冲系统的联合辨识算法 (赵延龙, 张纪峰)

2022-07-11

This paper is concerned with parameter estimation of finite impulse response (FIR) systems with binary observations. Combining a suitable design of the time-varying thresholds, a kind of sign-error type unified algorithm with projection is investigated for either deterministic systems or stochastic systems. The convergence properties of the studied algorithm are established under bounded persistent excitations. Specifically, for the case without noise, the square convergence rate is proved to be close to  $O(1/k^2)$  with respect to the time step  $k$ . For the case with bounded noises, the upper bound of the estimation error is obtained, which depends on the bound of the noises and the lower bound of the input persistent excitation condition. For the case with independent and identically distributed (i.i.d.) stochastic noises, the estimate is shown to converge to the true parameter in the sense of mean square and almost surely. Besides, the mean square convergence rate of the estimation error is of the order  $O(1/k)$ . Numerical examples are supplied to demonstrate the theoretical results.

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