Fan, Tao; **Lin, Yun**

A variable step-size strategy based on error function for sparse system identification. (English) Zbl 1386.93316

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Summary: The well-known reweighted zero-attracting least mean square algorithm (RZA-LMS) has been effective for the estimation of sparse system channels. However, the RZA-LMS algorithm utilizes a fixed step size to balance the steady-state mean square error and the convergence speed, resulting in a reduction in its performance. Thus, a trade-off between the convergence rate and the steady-state mean square error must be made. In this paper, utilizing the nonlinear relationship between the step size and the power of the noise-free prior error, a variable step-size strategy based on an error function is proposed. The simulation results indicate that the proposed variable step-size algorithm shows a better performance than the conventional RZA-LMS for both the sparse and the non-sparse systems.

MSC:

93E24 Least squares and related methods for stochastic control systems
93E11 Filtering in stochastic control theory

Keywords:

adaptive filtering; least mean square; sparse channel estimation; reweighted zero-point attracting; variable step size; system identification

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