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**A Robust Leaky-LMS Algorithm for Sparse System Identification**

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**Abstract**

In this paper, a new Leaky-LMS (LLMS) algorithm that modifies and improves the Zero-Attracting Leaky-LMS (ZA-LLMS) algorithm for sparse system identification has been proposed. The proposed algorithm uses the sparsity of the system with the advantages of the variable step-size and *l0*-norm penalty. We compared the performance of our proposed algorithm with the conventional LLMS and ZA-LLMS in terms of the convergence rate and mean-square-deviation (MSD). Additionally, the computational complexity of the proposed algorithm has been derived. Simulations performed in MATLAB showed that the proposed algorithm has superiority over the other algorithms for both types of input signals of additive white Gaussian noise (AWGN) and additive correlated Gaussian noise (ACGN).

**Keywords**

Adaptive filters Sparse system identification Leaky LMS *L*0-norm penalty