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A recursive least squares algorithm for an orthogonal IIR adaptive line enhancer. (English)

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Summary: A novel method is described for the frequency estimation of signals from a noisy background. It is based on realizing the IIR adaptive filter as a parallel connection of discrete orthogonal sections. A fast Gauss-Newton type recursive algorithm has also been derived to update the parameters of these orthogonal sections. It has been shown that for highly noisy signals, this approach significantly improves the frequency estimation capabilities as well as increases the overall signal-to-noise ratio of the adaptive recursive filters. Illustrative examples are given to verify these results.

MSC:

[94A12](#) Signal theory (characterization, reconstruction, filtering, etc.)

[93E11](#) Filtering in stochastic control theory

[68W10](#) Parallel algorithms in computer science

[68U20](#) Simulation (MSC2010)

Keywords:

least squares algorithm; frequency estimation of signals; frequency estimation; signal-to-noise ratio; adaptive recursive filters

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