Fahmy, M. F.; **El-Raheem, G. M.**; **Ibrahim, H. M.**
A recursive least squares algorithm for an orthogonal IIR adaptive line enhancer. (English)
Zbl 0859.94003

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

Full Text: DOI

References:

[1]   Tavsanoglu, IEEE Trans. Circuits and Systems CAS- 31 pp 884– (1984)

[2]   Thiele, Int. j. cir. theor. appl. 12 pp 39– (1984)

[3]   Thiele, IEEE Trans. Circuits and Systems CAS- 33 pp 502– (1986)

[4]   Li, IEEE Trans. Circuits and Systems I CAS- 39 pp 365– (1992)

[5]   Lutz, IEEE Trans. Circuits and Systems CAS- 35 pp 1114– (1988)

[6]   Hinamoto, Int. J. Syst. Sci. 22 pp 1729– (1991)

[7]   Hwang, IEEE Trans. Acoust., Speech Signal Process. ASSP- 25 pp 273– (1977)

[8]   Amit, IEEE Trans. Acoust., Speech, Signal Process. ASSP- 36 pp 880– (1988)

[9]   Moore, IEEE Trans. Automatic Control AC- 26 pp 17– (1981)