Some Algorithms for the Attenuation of Broadband Noise

Michael Arciero

Department of Mathematical Sciences
United States Military Academy
West Point, New York

ARL Advisor: Thyagaraju Damarla

SEDD/Acoustics
U.S. Army Research Laboratory
Adelphi, Maryland

ABSTRACT:

We investigate several algorithms in the attenuation of broadband noise in both vehicle-mounted and ground arrays in an effort to increase target detection range. Many adaptive filtering techniques have been developed for use in noise cancellation applications when the noise statistics are unknown and non-stationary; or changing over time. We adapt variants of the least-mean-square algorithm to simulations as well as ARL test data. The computationally efficient block LMS algorithm is less sensitive to signal transients due to the use of averaging, and is therefore more stable. The normalized LMS algorithm gives more rapid convergence in highly non-stationary situations. Also investigated is an algorithm based on a lattice structure, which exhibits low variance as well as computational efficiency.

KEY WORDS: Noise cancellation, Least Mean Square algorithm.

CONTACT: Michael Arciero, USMA, West Point, NY 10996
Tel: (845) 938-2453 email: am9272@usma.edu

Thyagaraju Damarla, ARL, Adelphi, MD, 20783
Tel: (301)-394 1266 email: damarla@arl.mil