

Adaptive Signal Processing

Signal processing has become an important tool in almost all fields of science and engineering. In practice, the characteristics of signals /systems are either not known or change with time (independent variable) due to many reasons. In some cases, like speech their very changing characteristic nature is of utility and importance. However in cases like noise control, echo cancellation and long distance communication, the time variant behavior of the system/ signal involved is undesirable. Therefore, processing techniques/algorithms should adapt to the unknown characteristics, which may be time invariant or variant. Hence to extract valid information in a changing scenario, algorithms suitable for time invariant case have to be made adaptive to preserve their performance. In many cases, though a common adaptation rule is valid, it may be necessary to tailor it for a specific application. The adaptive algorithms should be: simple, computationally efficient, implementable on the existing hardware platform like digital signal processors and cost effective for commercial utility. These requirements create many new theoretical challenges and motivate the development of new algorithms. Any real time processing has to be adaptive and some of the common applications are: compression and coding, active control of noise (inside aircraft cabin and automobiles, industrial noise) and vibration, adaptive structures and other physical quantities, communication applications like channel equalization, acoustic and line echo cancellation, adaptive antenna arrays and adaptive processing of biomedical signals (ECG, EEG and Evoked potential (EVP)).

Course Contents

- Spectral Estimation, Parametric Spectral Modeling

- Method of Steepest Descent Algorithm, Least Mean Square Algorithm and its variants, Lattice and Transform domain adaptive filters, Frequency domain/ block LMS algorithm, Subband adaptive algorithm, IIR adaptive filters, Recursive least square (RLS) algorithm.

- Applications like active noise control, Echo cancellation, Channel equalization, ADPCM, Biomedical Applications etc.

- Implementation of the adaptive filters on the DSP processors and practical demonstration of Active noise control system.

GENERAL INFORMATION

Eligibility: Research scientists, practicing engineers, graduate students and educators with a basic background of B.E level in Electronics, Communication, Electrical, Mechanical and Aerospace Engineering.

Registration: The registration fee is Rs.4000/- which includes a copy of the lecture notes, working lunch, tea/coffee on all days. For students, the registration fee is Rs.2000/-.

Intake: About 45 participants by registration only. Applications in the prescribed format (given in this brochure) with the registration fee must be sent on or before 5th of October 2008 to: The Convener, KTMD, National Aerospace Laboratories, PB 1779, Bangalore 560 017.

Venue: National Aerospace Laboratories, Kodihalli Campus, 43 km from new airport, 12km from city railway station and KSRTC bus stand. Accommodation for a limited number of participants is available at NAL Guest House.

REGISTRATION FORM

Name:

Qualification:

Organization/Institution:

Mailing address:

Phone:(off)

(Mobile)

Email:

Accommodation : Required / Not required

Signature of the Participant

Signature of the Head of the Institution

Mode of Payment: Payments should be made through crossed demand draft on any nationalised scheduled bank in favour of **ASP-2008**. Payable at Bangalore and sent to the Convener of the Workshop.

To

Dr M N Sathyanarayana
Convener, ASP-2008
KTMD, National Aerospace Laboratories
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S.V.Narasimhan BE (IISc), MTech (IITM), PhD (IISc)

Field of research: Active Noise Control, Adaptive Signal Processing, Spectral estimation, System identification based on Cyclostationarity, Bispectrum; Time-frequency Signal Processing, Wavelet transform, Speech enhancement and EEG Signal Processing.

He has published many papers in international journals and in National /International Conference proceedings in the above areas. Further he has guided 35 M.Tech projects and delivered many invited lectures.

He has authored the book

Signal Processing: Principles & Implementation
NAROSA INDIA publishers, New Delhi, India
(National),
ALPHA SCIENCE publishers, U.K (International).

As a Guest faculty he has taught one semester course on *Adaptive Signal Processing* at IISc, Bangalore, during January-April, 2004 and 2006. He was faculty for NAL-UNI courses on *Discrete Time Signal Processing Applications*, *Active Control of Noise and Vibration* and *Introduction to Wavelet Transform*.

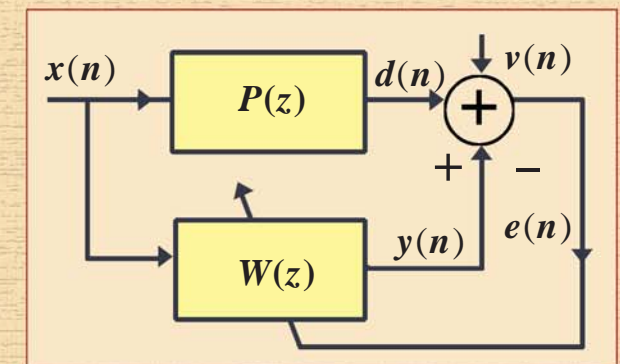
He is the Principal investigator for the projects: Multichannel Active Noise Control (NPSM), Active Noise Control (AR&DB), Active Noise Control for Pilot's Headset and Cockpit (DISMAS 2006-2008).

**50 Years of
National Aerospace Laboratories**



**National Workshop on
ADAPTIVE SIGNAL PROCESSING**

4 -7 November 2008



**Registration and Inauguration
3 November 2008 at 2.30 p.m.**

**Chairman
Dr S V NARASIMHAN**

NAL Golden Jubilee Year 2008-09