Two-day Workshop on

Adaptive/Smart Antennas

by

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Summary

A new adaptive methodology will be described that can also take care of the various electromagnetic interactions between the antenna array and the platform on which it is mounted in addition to the mutual coupling and nonuniformity in the antenna element spacing. To accomplish this goal a single snapshot based direct data domain least squares method is proposed which does not require any information of the clutter or noise characteristics and can be implemented in real time on a DSP chip. The number of coherent interferers that this method can handle is identical to the conventional adaptive techniques which require a block of data, whereas the classical method can deal with a larger number of incoherent interferers. The strength of a deterministic model for the signal of interest yields a lower value for the Cramer-Rao bound than stochastic methods. In this approach, no statistical information about the interference environment is necessary. This makes it possible to perform real time processing in a dynamic environment. These principles will be illustrated for space-time adaptive processing of real experimental data obtained from an airborne multi-channel radar system. The application of this technique to real airborne measured data set (MCARM) to perform STAP processing will be described and comparison will be made to the performance of the conventional stochastic based methodology.

The workshop will consist of three parts:

Part 1: It will present a direct data domain least squares single snapshot based methodology to cancel interferers in the main beam of an antenna array. It will also illustrate why a new methodology is necessary even though the adaptive antennas has been in the literature till the 1960's but till today there is no reliable practical systems.

Part 2: To have reliable practical system it is necessary to couple the electromagnetic problem with the signal processing methodology as the mutual coupling between the antenna elements and the platform on which they are mounted needs to be taken into account

Part 3: A practical implementation on a forward looking airborne RADAR will be presented to carry out space time adaptive processing (STAP)

Biography

Tapan K. Sarkar received the B.Tech. degree from the Indian Institute of Technology, Kharagpur, in 1969, the M.Sc.E. degree from the University of New Brunswick, Fredericton, NB, Canada, in 1971, and the M.S. and Ph.D. degrees from Syracuse University, Syracuse, NY, in 1975. He is now a Professor in the Department of Electrical and Computer Engineering, Syracuse University. His current research interests deal with numerical solutions of operator equations arising in electromagnetics and signal processing with application to system design. He obtained one of the "best solution" awards in May 1977 at the Rome Air Development Center (RADC) Spectral Estimation Workshop. He received the Best Paper Award of the IEEE Transactions on Electromagnetic Compatibility in 1979 and in the 1997 National Radar Conference. He has authored or coauthored more than 300 journal articles and numerous conference papers and 32 chapters in books and 15 books.

He received Docteur Honoris Causa both from Universite Blaise Pascal, Clermont Ferrand, France in 1998 and from Politechnic University of Madrid, Madrid, Spain in 2004. He received the medal of the friend of the city of Clermont Ferrand, France, in 2000.

Date : 18 and 19 Feb., 2013 (Monday to Tuesday)
Time : 3:30pm – 5:00pm
Venue : G6302, 6/F, Green Zone, Academic 1,
City University of Hong Kong

***** ALL ARE WELCOME *****

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