



Short Course

Day 1: Tuesday, 23 Nov. 2010

Venue: Capri Hall



Short Course 1

Eigenvalues and Eigenvectors in Array Antennas – Optimization of

Array Antennas for High Performance

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10:00 -12:30

Abstract

The main factor to deteriorate the quality of the desired signal in the wireless communications is a frequency selective fading due to multipath propagation and co-channel interference. Therefore, the spatial signal processing technology using the array antenna has been one of the important approaches for improving the communication quality. In addition, this technology plays an effective role in the MIMO system. Therefore, this short course expresses the optimization of the array antenna for its high performance by explaining the significance of eigenvalues and the eigenvectors of various matrices used in the array antenna. Particularly, we pay fundamental attention to a gain of the array antenna, optimum weights of adaptive arrays, and the estimation methods of direction of arrival (DOA) of the incident waves as some typical examples of the eigenvalues and the eigenvectors in the array antenna. Through these demonstrations, the optimization of array antennas is discussed.

About the speaker

Nobuyoshi Kikuma was born in Ishikawa, Japan, on January 7, 1960. He received the B.S. degree in electronic engineering from Nagoya Institute of Technology, Japan, in 1982, and the M.S. and Ph.D. degrees in electrical engineering from Kyoto University, Japan, in 1984 and 1987, respectively. From 1987 to 1988, he was a Research Associate at Kyoto University. In 1988 he joined Nagoya Institute of Technology, where he has been a Professor since 2001. His research interests include adaptive and signal processing array, multipath propagation analysis, mobile and indoor wireless communication, wireless power transmission, and electromagnetic field theory. He received the 4th Telecommunications Advancement Foundation Award in 1989 and Paper Award from the IEICE of Japan in 2006. Dr. Kikuma is a senior member of the IEEE and a regular member of the IEICE of Japan.