

Tutorial: Beamforming Narrowband and Broadband Signals

(Approved for 0.4 Continuing Education Units and 4 Professional Development Hours)

Instructor: John E. Piper

Overview

Signal and array processing are core topics at OCEANS' conferences. This tutorial on beamforming narrowband and broadband signals will cover conventional approaches along with advanced techniques.

Target Audience

There are a large number of engineers and scientists interested in advanced signal processing techniques. This tutorial will present material for those interested in learning about the fundamentals of beamforming as well as advanced techniques.

Content Details

This tutorial will primarily be based on my online book chapter, "Beamforming Narrowband and Broadband Signals". It will also incorporate material from previous tutorials, including "Multipath cancellation in the spatial and time domains" and "High resolution signal and array processing." Other popular techniques will be also discussed. It should be noted that conventional approaches are generally based on a model that implicitly assumes only one signal. It is one of the goals of this tutorial to show the advantages of models with multiple signals. It is also a goal of this tutorial to present broadband beamforming techniques based on time-shift operators.

Format

The tutorial will be based on PowerPoint slides and classroom discussions.

Instructor Bio:

Dr. Piper has a long term interest in signal processing. Many of his publications have been ranked #1 by IEEExplore (see "multipath cancellation" and "maximum likelihood function") and Google (see "multipath cancellation" and "beamforming narrowband"). He is currently employed by the Naval Surface Warfare Center – Panama City Division and can be contacted at john.e.piper@navy.mil.