Adaptive Arrays

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Adaptive arrays improve the reception of desired signals in the presence of interference signals in radar, sonar, seismic, and communications systems. They automatically sense the presence of interference and suppress them while simultaneously enhancing desired signal reception without prior knowledge of the signal/interference environment. Adaptive arrays are designed to complement other interference suppression techniques, such as low sidelobes, spread-spectrum techniques, and high directivity.

This short course is broken into three parts: (1) Fundamentals – arrays, digital beamforming, signals, terminology, (2) Algorithms – gradient based, direction inversion of the covariance matrix, random search, and non-digital beamforming approaches, and 3) Advanced concepts – array calibration and compensation, multipath, MIMO, and reconfigurable arrays. The material in the course is based on the two books:

- R. A. Monzingo, R. L. Haupt, and T.W. Miller, *Introduction to Adaptive Arrays, 2ed.*, SciTech Publishing, 2010.
- R.L Haupt, *Antenna Arrays: A Computational Approach*, New York: Wiley, 2010.