

An Eigen-Approach for Estimating the Direction-of Arrival of Unknown Number of Signals

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Abstract : A technique for estimating the direction-of-arrival (DOA) of unknown number of source signals is presented using the eigen-approach. The eigenvector corresponding to the minimum eigenvalue of the autocorrelation matrix yields the minimum output power of the array. Also, the array polynomial with this eigenvector possesses roots on the unit circle. Therefore, the pseudo-spectrum is found by perturbing the phases of the roots one by one and calculating the corresponding array output power. The results indicate that the DOAs and the number of source signals are estimated accurately in the presence of a wide range of input noise levels.

Keywords : array signal processing, direction-of-arrival, antenna arrays, Eigenvalues, Eigenvectors, Lagrange multiplier

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