Abstract

The smart antenna systems combine antenna arrays with digital signal processing (DSP) algorithms. In a smart antenna system a specialized signal processor computes the direction of arrival (DOA) of a user and also adds the strength of the signals from each antenna element together to form a beam towards the direction as computed by DOA. If additional users join in
The Mutual Coupling Effect on the MUSIC Algorithm for Direction of Arrival Estimation

the system, the adaptive antenna processor can tune out unwanted interferers by placing nulls
towards the signals not of interest, and concentrate on the desired user by the main beam
toward the signal of interest. Smart antenna systems integrate with radio intelligence with
antenna array technology to increase the channel capacity, coverage range and improve link
quality. In adaptive array smart antenna, to locate the desired signal, various DOA estimation
algorithms are used. This paper investigates the effect of mutual coupling on the Multiple Signal
Classification (MUSIC) algorithm for DOA estimation and compares its performance with Bartlett
algorithm. The half wavelength dipole antenna elements are used in the linear array antenna to
carry out a performance study of the MUSIC and Bartlett algorithms by investigating the effect
of the mutual coupling between the array elements. However simulation results in this paper
show that MUSIC algorithm is highly accurate and stable and provides high angular resolution
compared to Bartlett and hence applying the MUSIC algorithm is preferred in mobile
communication to estimate the DOA of the arriving signals.

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Index Terms

Computer Science  Signal Processing
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