DOA Estimation Using Golden Section Search

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Abstract : DOA technique is a localization technique used in the communication field. Various algorithms have been developed for direction of arrival estimation like MUSIC, ROOT MUSIC, etc. These algorithms depend on various parameters like antenna array elements, number of snapshots and various others. Basically the MUSIC spectrum is evaluated and peaks obtained are considered as the angle of arrivals. The angles evaluated using this process depends on the scanning interval chosen. The accuracy of the results obtained depends on the coarseness of the interval chosen. In this paper, golden section search is applied to the MUSIC algorithm and therefore, more accurate results are achieved. Initially the coarse DOA estimations is done using the MUSIC algorithm in the range -90 to 90 degree at the interval of 10 degree. After the peaks obtained then fine DOA estimation is done using golden section search. Also, the partitioning method is applied to estimate the number of signals incident on the antenna array. Dependency of the algorithm on the number of snapshots is also being explained. Hence, the accurate results are being determined using this algorithm.

Keywords : Direction of Arrival (DOA), golden section search, MUSIC, number of snapshots

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