Abstract

Direction of arrival (DOA) estimation is one of the focal problems in the fields of Wireless communications, Radar, Sonar, Radio Astronomy and Seismology. The main objective of the DOA estimation is to obtain the desired signals direction as well as the interference signals direction based on the data received from the array sensor at the base station. In the literature various techniques are available among which the two high resolution algorithms namely MUSIC (MUltiple SIgnal Classification) and ESPRIT (Estimation of Signal Parameters via Rotational Invariance Technique) are used for direction of arrival estimation in this paper. The work presented in this paper deals with EMD application to the DOA estimation as a preprocessing technique. The key feature of EMD is to decompose a signal into sum of intrinsic mode functions (IMF’s) with a final residue. This technique separately de-noises the rows of the array data matrix where each row corresponds to the output of a particular array sensor. Especially in low-SNR conditions, the estimation performance of MUSIC and ESPRIT algorithms is enhanced significantly when de-noising is given to array data matrix prior to DOA estimation stage.
References


Index Terms

Computer Science
Signal Processing
Keywords

Direction of arrival (DOA), Multiple Signal Classification (MUSIC), Estimation of Signal Parameters via Rotational Invariance Technique (ESPRIT), Empirical Mode Decomposition (EMD), Intrinsic Mode Function (IMF).