Abstract

Direction-of-Arrival (DOA) estimation plays a vital role in many applications. Beamforming is the most prominent technique to estimate DOA. In this survey, a study of various beamforming techniques and algorithms to estimate the direction of arrival of a signal is made. An assessment on the background robust algorithms using Nyquist sampling rate and its Compressive sensing alternative is done. It is known that Bearing estimation algorithms obtain only a small number of direction of arrivals (DOAs) within the entire angle domain, when the sources are spatially sparse. Hence, it may be concluded that, the methods those specifically exploits this spatial sparsity property is advantageous. These methods use a very small number of measurements in the form of random projections of the sensor data along with one full waveform recording at one of the sensors.

References

- Barry D. Van Veen and Kevin M. Buckley, "Beamforming: A Versatile Approach to
Spatial Filtering; IEEE ASSP magazine April 1988.
- R. Li, X. Zhao, and X. W. Shi; Derivative Constrained Robust LCMV Beamforming Algorithm; Progress In Electromagnetics Research C, Vol. 4, 2008.
- Xin Song, Jinlun Wang, Bin Wang, Yinghua Han; Robust Adaptive Beamforming under in the Presence of Mismatches; Proceedings of the IEEE International Conference on Automation and Logistics, August 2009.
- Yong Zhao, Wei Liu; Langley, R. J.; Robust Broadband Beamforming Based on Frequency Invariance Constraints and worst-case Performance Optimization; Proceedings of the 4th International Symposium on Communications, Control and Signal Processing, March 2010.
- Yong Zhao, Wei Liu; Langley, R. J.; Adaptive Wideband Beamforming With

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