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LDL Decomposition-based FGPA Real-time Implementation of DOA Estimation
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Abstract
An FGPA implementation and real-time experimental verification of proposed direction of arrival (DOA) estimation algorithm employing LDL decomposition are presented in this paper. The proposed algorithm is implemented on a Xilinx FGPA using LabVIEW software and its real-time experimental verification is performed using National Instruments (NI) PXI platform. The proposed method has several advantages over methods based on either singular value decomposition (SVD) or eigen value decomposition (EVD). One important advantage is that LDL executes faster as it requires significantly smaller number of operations (O(n{3}/6)) compared with EVD (O(n{3})). Results from Matlab simulations and real-time experiments demonstrate the effectiveness of the proposed method. Successful FGPA compilation reports show low resource usage and faster computation time for LDL-based method compared with QR-based implementations. Performance comparison is done in terms of estimation accuracy, FGPA processing time and resource utilization. © 2018 IEEE.

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