URN etd-0407109-183723-1958
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Statistics This thesis had been viewed 38 times. Download 0 times.
Department
Year 2001
Semester 1
Degree Master
Type of Document Master's Thesis
Language English
Title Realizing Techniques forReal-Time Direction Finding System and Its Multi-Channel Sampling/Calibrations
Date of Defense 0000-00-00
Page Count 65
Keyword
ultrasonic phase array system
direction of arrival
multi-channel acquisition circuit
array calibration
unit-norm constrained adaptive filter

Abstract
This thesis constructs a self-developed ultrasonic phase array system, comprising synchronous receivers with a PLL circuit, and a multi-channel acquisition circuit to receive an ultrasonic sinusoidal signal and then transmit to a DSP target board in real-time estimation. The real time direction finding process used is a unit-norm constrained adaptive filter algorithm. To allow for the non-ideal behaviour of components in the phase array system, three well known array calibration methods are studied, and we finally adopted statistical direction vectors for array calibration and building a database using a variety of direction finding algorithms with Code Composer StudioTM. Thus, real-time direction finding is implemented in the proposed ultrasonic phase array system.
Keywords: ultrasonic phase array system, multi-channel real-time sampling, DOA.
Advisory Committee Hsien-Tsai Wu - advisor

Fu-Kun Chen - advisor

Files No Any Full Text File.
Date of Submission 2002-08-26