Abstract

Engineering

RECENT PROGRESS OF FRACTIONAL FOURIER TRANSFORM IN ULTRASONIC SIGNAL PROCESSING, Yufeng Lu, In Soo Ahn, Department of Electrical and Computer Engineering, Bradley University, Peoria, IL 61625, ylu2@bradley.edu , isa@bradley.edu

As a generalized Fourier transform, Fractional Fourier transform (FrFT) has been utilized for different applications such as radar imaging, sonar signal processing, blind source separation, and beamforming in medical imaging. In this presentation, recent progress of FrFT for ultrasonic signal processing is discussed. In particular, FrFT-based chirplet signal decomposition algorithm is used to analyze ultrasonic signal for NDE applications. Dominant chirplet echoes are isolated for successive signal decomposition and parameter estimation. The algorithm is applied to characterize echoes and estimation parameters for benchmark and ultrasonic experimental data. This study may have a broad range of applications in target detection and pattern recognition.