Detection of Short Dispered Pulse Signals (Yeda)
code: T4-1802
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Summary

Pulses are applied in various fields such as oil & gas exploration, detection (e.g. sonar, lidar and radar) and communication. When pulses pass through dispersive media, the arrival times at the detector of different frequency components may differ, and as a result the pulse may become degraded (e.g. transformed to a longer pulse with reduced intensity), even to the level of becoming indistinguishable in terms of signal to noise. This problem becomes even more challenging when detecting short pulses that travel through complex or unknown media.The new method presented here provides a proven and efficient solution that can be applied for different scenarios where short pulses dispersed by complex media are used.

Applications

Detection and surveying technologies- sonar, lidar, radar etc

Advantages

Efficient, requires limited computational resources
Generic, can be applied to various setups
Easily implementable into existing systems

echnology's Essence

he method includes obtaining an input array of cells, each indicating an intensity of a frequency component f the signal at a representative time. A fast dispersion measure transform (FDMT) is applied to concurrently um the cells of the input array that lie along different dispersion curves, each curve defined by a known on-linear functional form and being uniquely characterized by a time coordinate and by a value of the spersion measure. Application of FDMT includes initially generating a plurality of sub-arrays, each epresenting a frequency sub-band and iteratively combining pairs of adjacent sub-arrays in accordance with n addition rule until all of the initially generated plurality of sub-arrays are combined into an output array of he sums, in which a cell of the output array that is indicative of a transmitted pulse is identified.

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