Time-Reversal Imaging of Distant Targets in a Shallow Water Channel

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Abstract: Time-reversal imaging (TRI) is analogous to matched-field processing, although TRI is typically very wideband and it affords the potential of target classification (in addition to localization). In this paper we apply TRI to mine-like targets situated in shallow water, as well as to submarine-like targets at long range. We present TRI results on both measured and simulated scattering data, for both target classes. In addition to the imaging, we explore extraction of features from the time-reversal image, with these applied to target classification. Time-reversal implementation requires a fast forward model, with that implemented here via a modal as well as a parabolic-equation algorithm. In this talk we discuss the underlying theory of TRI, feature extraction and detection/classification, with several example results presented.

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