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13. Abstract (Maximum 200 words). Previous investigators have evaluated higher-order correlations and spectra for detection and time delay estimation of statistical signals. In this study detection of known and unknown deterministic transients, especially those which are narrow band, is considered. Initial results have been reported [G. E. Ioup, J. W. Ioup, K. H. Barnes, R. L. Field, J. H. Leclere, and G. H. Rayborn, IEEE Workshop on Higher-Order Spectral Analysis Proc., 46-55 (1989)]. For narrow-band signals extending from frequency f_B to f_T , the bispectrum is zero unless $2f_B < f_T$ and the trispectrum has zero energy in the first and seventh octants unless $3f_B < f_T$, although the remaining octants of the trispectrum are always nonzero. Conditions for adequate sampling for these spectra are presented. Moments and histogram analysis of the ordinate values of the transients are also used in the analysis of the detectors. Performance analysis using ROC curves shows that the simple biconrelation detector does not do nearly as well as correlation or triconrelation detectors for transients with $2f_B > f_T$. Other performance analysis results are also discussed.
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