Abstract View

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An Eigenvector Method for the Calculation of Directional Spectra from Heave, Pitch and Roll Buoy Data

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ABSTRACT

An eigenvector (EV) method for the determination of directional spectra from heave, pitch and roll buoy data is presented. Both a direct and an iterative form (based on an algorithm by Pawka) of this data-adaptive procedure are developed. The direct form outperforms the Longuet-Higgins et al. method, the cosine spread model and the maximum likelihood (ML) method for both simulated and real data. In the iterative form, the iterative EV method is superior to the other methods tested, including the iterative ML method for unimodal peaks when the noise-to-signal ratio is greater than 0.2 and for bimodal peaks at all noise levels. With real data, the direct EV method produced errors within an 80% confidence zone of the data cross-spectral matrix within the stopping criteria of Lawson and Long. Errors of the iterative EV and iterative ML methods were lower than for both the direct EV and ML results and were about the same magnitude when compared to each other. The iterative EV method, however, produced narrower, more sharply defined unimodal and bimodal spectra.