The Effect of Short-term Variability of Cross-Spectral Analysis on Wave Buoy Analogy

The short-term variability of cross-spectral analyses is investigated and its effect on the wave buoy analogy is analysed. Based on the analogy, the sea state can be estimated from the cross-spectra of the ship response, i.e. ship as a wave buoy. In a steady state condition, a certain length of sampled data is required for stable results of the spectral analysis. However, the phase lag between responses, in terms of the phase angle obtained from the coupled cross-spectra, has not been discussed in detail. In a previous study, the authors pointed out that the short-term variability of the relative phase angle of the cross-spectra might be harmful to sea state estimation using the wave buoy analogy. In this paper, using long stationary time series, the transition of estimated wave parameters has been investigated by iterative analyses with a few seconds of time shifting. In the results, the short-term variability of the wave parameters was observed, and the effect was clarified.

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