

Abstract:

Willard J. Pierson illustrated 1961 how a two-component Gaussian wave model can result in realistic, and sometimes quite unrealistic, wave shapes. David Slepian constructed 1962 an explicit model for the conditional behaviour of a Gaussian process after a level crossing. I will talk about how to combine these two ideas to get a detailed model for what happens in realistic random waves around the wave crests, in particular the relation between the random asymmetry of the individual waves and the orbits of the water particles at the wave crests. The research was done together with Marc Prevosto, emeritus from the French ocean research institute IFREMER in Brest and published in two recent articles in Journal of Fluid Mechanics, 2020 and 2021.