

Interfacial Gerstner waves

Abstract: We investigate Gerstner's trochoidal wave, the only known explicit solution to the gravity water wave problem on infinite depth. From the governing equations formulated in Lagrangian coordinates, we will discuss first Gerstner's classical solution for a single fluid, the basis for recent extensions to model explicit interfacial waves. These rotational solutions - in a two fluid configuration akin to the dead water phenomenon, as well as in multiple layer solutions and topographically trapped "edge waves" - show a striking agreement with irrotational first and second-order theory; we will illustrate some of these connections.