

Asymptotics and Model Equations for Water Waves: Towards the KdV, with applications to tsunami – Part 2

The second part of this expository series on asymptotics will begin where the first part left off: with the full equations for incompressible, inviscid fluid flows with a free boundary. Using multiple-scales methods, we will see how one of the simplest equations modeling bi-directional waves (the "wave equation") arises from this system, and subsequently investigate one of the components and its evolution over long time scales – giving rise to the Korteweg de Vries equation. If time remains, some perspectives will be given on the physical interpretation of this derivation (with some comments on tsunami in the open oceans), as well as on related model equations and their derivation by asymptotic analysis.