J. L. Bona Long Wave Models for Three-dimensional Water Waves

Model equations for the full, three-dimensional surface water wave problem will be derived. They are shown rigorously to provide good approximations to solutions of the full Euler equations over a long time scale. Numerical simulations of certain of these models are described and this leads to questions of approximation by decoupled systems in the two-dimensional case. These questions can be answered exactly in the context of our theory.