



LONG WAVES ON WATER OF VARIABLE DEPTH

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ABSTRACT

This dissertation is mainly a review of some of the work done by various authors on the long wave (shallow water) approximation and its applications to different problems. Shallow water wave equations are derived which are identical with Stoker's equations but the method of derivation is slightly different.

The method of characteristics is used in solving the differential equations governing the shallow water wave theory. The climbing and breaking of waves on sloping beaches is discussed. After the derivation of the transport equations for the discontinuities that can exist across a characteristic an equation is obtained for the time and hence the distance of breaking.

A simple explanation of the formation of a bore in a sloping stream is given here. The climb of a bore on a beach of uniform and non-uniform slope is also discussed briefly because of its close resemblance to non-uniform shock propagation in gas dynamics.

The notion of tsunami waves and the use of shallow water wave theory in the study of the numerical simulation of realistic tsunamis is also discussed briefly.