

1131-76-152

Yue Liu* (yliu@uta.edu), Department of Mathematics, University of Texas at Arlington, Arlington, TX 76019. *Asymptotic analysis on the modelling of the shallow-water waves with the Coriolis effect.* Preliminary report.

In this talk, a mathematical model of long-crested water waves propagating mainly in one direction with the effect of Earth's rotation is derived by following the formal asymptotic procedures. Such a model equation is analogous to the Camassa-Holm approximation of the two-dimensional incompressible and irrotational Euler equations and has a formal bi-Hamiltonian structure. Its solution corresponding to physically relevant initial perturbations is more accurate on a much longer time scale. It is shown that the deviation of the free surface can be determined by the horizontal velocity at a certain depth in the second-order approximation. The effects of the Coriolis force caused by the Earth rotation and nonlocal higher nonlinearities on blow-up criteria and wave-breaking phenomena are also investigated. Our refined analysis is approached by applying the method of characteristics and conserved quantities to the Riccati-type differential inequality. (Received July 12, 2017)