

1116-76-757

**Catherine Sulem\*** ([sulem@math.toronto.edu](mailto:sulem@math.toronto.edu)), Department of Mathematics, University of Toronto, Toronto, ON M5S2E4, Canada. *normal forms transformations for water waves.*

Normal forms transformations for a dynamical system in a neighborhood of a stationary point retain only the significant nonlinearities, eliminating inessential terms. We consider the equations of water waves in a two-dimensional channel of finite or infinite depth, in the setting of spatially periodic solutions. These equations are considered in the framework of Hamiltonian systems, for which the Hamiltonian energy has a convergent Taylor expansion in canonical variables near the equilibrium solution. We give an analysis of the Birkhoff normal form transformation that eliminates third-order non-resonant terms of the Hamiltonian. We also provide an analysis of the dynamics of remaining resonant triads in certain cases. This is joint work with Walter Craig (McMaster University). (Received September 11, 2015)