

Traveling water waves

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ABSTRACT

I will describe an existence theorem for traveling waves in water. The first such in two dimensional settings is due to T. Levi-Civita and D. Struik in the 1920's. In a recent paper we prove a general result for three dimensions (well, for any number of dimensions), when there is surface tension. The approach is surprisingly close to the Lyapunov center theorem of A. Weinstein, using the fact due to V. Zakharov that the water waves problem is a Hamiltonian system. Without surface tension the problem exhibits small divisors, and is more difficult.