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Water Waves, Integrability, Stability

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The nonlinear water wave equations have been known and heavily studied –since the 1800s. The study of integrable nonlinear dispersive wave equations is more recent –since the mid 1900s. Some novel integrable equations will be mentioned. Interestingly, numerous asymptotic reductions of the water wave equations are integrable, particularly in shallow water. Stability of important solutions in water waves has also been heavily studied since the mid-1900s. Of more recent interest has been large amplitude waves that appear unexpectedly, called rogue waves. Transverse instability of some rogue wave solutions will be discussed.