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**John K Hunter\*** ([jkhunter@ucdavis.edu](mailto:jkhunter@ucdavis.edu)), Department of Mathematics, University of California at Davis, Davis, CA 95616. *Scale-Invariant Hamiltonian Waves*.

We will analyze a class of nonlinear, and in general spatially nonlocal, Hamiltonian evolution equations that describe the self-interaction of weakly nonlinear scale-invariant waves in one space dimension. This class includes the inviscid Burgers equation, the Hunter-Saxton equation, and singular integro-differential equations that provide an asymptotic descriptions of weakly nonlinear hyperbolic surface waves, such as nonlinear Rayleigh waves in elasticity. We will give conditions for short time existence of smooth solutions, and show numerical computations of singularity formation obtained using a spectral viscosity method. (Received August 23, 2005)