as a model for water waves, even showing up as a model for *deep water* waves. Some implications will also be discussed: role of frame speed, degeneracy of vector conservation laws, implications for coupled KdV equations, and the application to stratified flow.

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The Serre Equations

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Abstract:

The Serre equations are a pair of strongly nonlinear, weakly dispersive, Boussinesq-type partial differential equations. They model the evolution of the surface elevation and the depth-averaged horizontal velocity of an inviscid, irrotational, incompressible fluid on a horizontal bottom. We present recent results in which numerical solutions are compared with data from physical experiments. Additionally, we asymptotically establish that waves with sufficiently small amplitude/steepness are stable while waves with sufficiently large amplitude/steepness are unstable.

Impact of tsunamis on Wave Energy Converters

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Abstract:

With an increasing emphasis on renewable energy resources, wave power technology is fast becoming a realistic solution. However, the recent tsunami in Japan was a harsh reminder of the ferocity of the ocean. It is known that tsunamis are nearly undetectable in the open ocean but as the wave approaches the shore its energy is

compressed creating large destructive waves. The question posed here is whether a nearshore wave energy converter (WEC) could withstand the force of an incoming tsunami. WECs of this type are usually located close to the boundary of dominance between linear and non linear effects. An analytical 3D model is developed within the framework of a linear theory and applied to an array of fixed plates [1]. The time derivative of the velocity potential allows the hydrodynamic force to be calculated, and the hydrostatic force can be calculated from the difference in free surface heights on either side of the device.
Results show that the loading for a typical tsunami is invariant with depth and maximum loading is felt at the center of the plate. By comparison with the loading from a typical swell, it is shown that the maximum force of a tsunami on a nearshore WEC will be approximately one hundreth of the magnitude of a regular sea state. We therefore conclude that an array of WECs will withstand a tsunami. A preliminary study on the non linear effects on nearshore WECs, in particular the effects of a sloping sea bed and multiple waves, is attempted through a comparison between the velocities of resonant and non resonant states. If after the first wave recedes the device is left on dry land, a second wave may act as a shock on the plate and do more damage than it would to a partially submerged device. This effect is demonstrated using a two dimensional non linear shallow water solver,VOLNA [2]. It is believed that dangerous configurations could be found with more detailed investigations.

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Symmetric solutions to the forced extended Korteweg-de Vries equation

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Abstract:

We consider steady symmetric solutions to the forced extended KdV equation exactly at linear resonance, as an extension to the spectrum of symmetric solutions of the forced KdV equation. A parametric relationship in terms of the quadratic