Variational Water Wave Modelling: from Continuum to Experiment

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Variational methods are investigated asymptotically and numerically to model water waves in tanks with wave generators. A modified Benney-Luke model is derived using variational techniques including a time-dependent gravitational potential mimicking a removable "sluice gate". As a validation, our modelling results using (dis)continuous Galerkin finite elements will be compared to a soliton splash event resulting after a sluice gate is removed during a finite time in a long water channel with a contraction at its end. Future work will explore these methods for wave-energy devices and ships in modest to heavy seas.