

Friday, November 10th (at 4.00pm, UK time)

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Title: A Generalised Hydrodynamics approach to the Boussinesq equation: a prototypical example of 2D stationary soliton gas

ABSTRACT

Generalised hydrodynamics (GHD) is a recent and powerful framework to study many-body integrable systems, quantum or classical, out of equilibrium. It has been applied to several models, from delta Bose gas to the XXZ spin chain, the KdV soliton gas and many more... yet it has only been applied to (1+1)D systems and generalisation to higher dimensions of space is non-trivial.

We then turn to the Boussinesq equation which, while generally considered to be less physically relevant than the KdV equation, is interesting as a stationary reduction of the (boosted) KP equation, a prototypical and universal example of a nonlinear integrable PDE in (2+1) dimensions. I will propose a heuristic approach inspired by the Thermodynamic Bethe Ansatz in order to construct the GHD of the Boussinesq soliton gas; the main motivation being that this is to be seen as a first step in the construction of the KP soliton gas, yielding insight on some classes of solutions from which we may be able to build an intuition on how to devise a more general theory.

Such an approach allows for a statistical mechanics interpretation of the Boussinesq soliton gas that comes naturally with the GHD picture. This also offers another perspective on the construction of anisotropic bidirectional soliton gases previously introduced phenomenologically by Congy et al.
