

1125-35-2144

Guillaume Bal*, gb2030@columbia.edu. *Some inverse problems and boundary controls for phase-space transport equations.*

Consider a prescribed solution to a diffusion equation in a domain embedded in a larger one. Can one (approximately) control such a solution from the boundary of the larger domain? The answer is positive and this form of a Runge approximation is a corollary to the unique continuation property (UCP) that holds for such equations. Now consider a (phase space) transport equation, which models a large class of scattering phenomena, and whose vanishing mean free path limit is the above diffusion model. This talk will present positive as well as negative results on the control of transport solutions from the boundary. In particular, we will show that internal transport solutions can indeed be controlled from the boundary of a larger domain under sufficient convexity conditions. Such results are not based on a UCP. In fact, UCP does not hold for any positive mean free path even though it does apply in the (diffusion) limit of vanishing mean free path. Such controls find applications in inverse problems that model a large class of coupled-physics medical imaging modalities.

This is joint work with Alexandre Jollivet (Received September 19, 2016)