Chez Pierre

Presents ...

Monday, September 23, 2019

12:00pm Noon

MIT Room 4-331

Chez Pierre Seminar

Joseph Indekeu – KU Leuven, Belgium

"Iteratively solving nonlinear growth, diffusion and convection."

A method is presented for calculating approximate analytic solutions for problems involving growth (or reaction), diffusion and/or convection. An iteration procedure based on the recently proposed BLUES (beyond linear use of equation superposition) function method [1] is shown to converge for a selection of nonlinear ordinary differential equations [2]. Case studies are presented for solitary wave solutions of the Camassa-Holm equation and for traveling wavefront solutions of the Burgers equation, with source terms. The method can be extended from ordinary to partial differential equations. This is illustrated using a simplified (deterministic) version of the Kardar-Parisi-Zhang equation supplemented with a nonlinear convective term for modeling aeolian dunes in a minimalistic fashion. 1. Indekeu J O and Müller-Nedebock K K (2018), BLUES function method in computational physics, J. Phys. A: Math. Theor. **51**, 165201; 2. Berx J and Indekeu J O (2019), Analytic iteration procedure for solitons and traveling wavefronts with sources, J. Phys. A: Math. Theor. Letter in press.