SKELETAL STOCHASTIC DIFFERENTIAL EQUATIONS FOR CONTINUOUS-STATE BRANCHING PROCESS

Dorottya FEKETE *University of Bath, UK*, E-mail: d.fekete@bath.ac.uk

Key words: Continuous-state branching processes, stochastic differential equations, skeletal decomposition, spine decomposition

Mathematical Subject Classification: 60J80, 60H30, 60G99

Abstract: It is well understood that a supercritical continuous-state branching process (CSBP) is equal in law to a discrete continuous-time Galton Watson process (the *skeleton* of *prolific individuals*) whose edges are dressed in a Poissonian way with immigration which initiates subcritial CSBPs (*non-prolific mass*).

Equally well understood in the setting of CSBPs and superprocesses is the notion of a *spine or immortal particle* dressed in a Poissonian way with immigration which initiates copies of the original CSBP, which emerges when conditioning the process to survive eternally.

In this talk, we revisit these notions for CSBPs and put them in a common framework using the language of (coupled) SDEs. In this way, we are able to deal simultaneously with all types of CSBPs (supercritical, critical and subcritical) as well as understanding how the backbone representation becomes, in the sense of weak convergence, a spinal decomposition when conditioning on survival.

This talk is based on joint work with Joaquin Fontbona (Universidad de Chile) and Andreas E. Kyprianou (University of Bath).