

Measure-valued branching processes of Dirichlet and Neumann nonlinear boundary value problems

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Abstract. We construct a measure-valued branching Markov process associated with a nonlinear boundary value problem, where the boundary condition has a nonlinear pseudo monotone branching mechanism term. The process is then used in the probabilistic representation of the solution of the parabolic problem associated with a nonlinear Neumann boundary value problem. Consequently, the classical association of the superprocesses to the Dirichlet boundary value problems also holds for the nonlinear Neumann boundary value problems. We emphasize the negative definite functions and their integral representations, occurring in the study of two classes of measure-valued Markov processes (superprocesses and discrete branching processes) and of the associated nonlinear operators. The talk is based on joint works with V. Barbu, O. Lupaşcu, and A.-G. Oprina.