Applied Analysis Seminar

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14:15, SR 9

Institut für Angewandte Mathematik
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PDE vs Delay formulation of structured population models

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Traditionally, age or size-structured population models have been formulated as first order hyperbolic PDEs often with non-local boundary conditions. In the past decades however, an alternative delay (abstract integral equation) formulation of physiologically structured population models have been developed. The main advantage of the delay formulation is that important theoretical results, such as the Principle of Linearised Stability, can be established. On the other hand, from the numerical point of view the delay formulation poses substantial challenges. In this talk we will explore the question of equivalence of the PDE and DE formulation for a class of models with so-called distributed recruitment. Using semigroup methods and the variation of constants formula, we establish the equivalence of the formulations for the linear case. For quasilinear models, however we anticipate serious difficulties/differences.