Uniqueness for a Paramater Identification Problem for a Nonlinear Parabolic Equation with Application in Population Dynamics and Magnetics

Barbara Kaltenbacher
University of Stuttgart
Barbara.Kaltenbacher@mathematik.uni-stuttgart.de

In this talk we demonstrate the use of Carleman estimates to prove identifiability of a coefficient function in a nonlinear parabolic PDE from initial and boundary data. Here, the coefficient depends on the spatial derivative of the PDE solution and appears in the principal part of the differential operator. Our result equally applies to problems where the coefficient depends on values of the PDE solution and the differential operator is in non-divergence form. Both situations appear in several applications. We here illustrate applicability of our uniqueness result for parameter identification problems in population dynamics and in magnetics. Computational experiments obtained by a method based on a multiharmonic expansion of the PDE solution illustrate the theoretical results.