

Analysis of Boundary Value Problems for PDEs

Workshop on the occasion of the 70th birthday of Gianni Gilardi

IMATI - CNR - PAVIA  imati – FEBRUARY 20, 2017



Program of the afternoon

14:30-14:40 Opening

14:40-15:00 PIERLUIGI COLLI, *laudatio*

15:00-15:40 JÜRGEN SPREKELS, “A nonstandard viscous Cahn–Hilliard system with dynamic boundary condition and the DCH”

Abstract: We consider a nonstandard Cahn–Hilliard model introduced by P. Podio-Guidugli. In contrast to former analytical treatments, a dynamic boundary condition is assumed for the order parameter. Results concerning wellposedness are proved, and an associated optimal control problem is studied, for which first-order necessary optimality conditions are derived. The results were obtained jointly with P. Colli and G. Gilardi.

15:40-16:20 ULLISSE STEFANELLI, “The magnetoelastic problem”

Abstract: I will review classical and recent results on the equilibrium of magnetoelastic solids. Modeling and analysis will progress from the linearized, to the incompressible, to the general, finite-strain theory. The talk reflects collaborations with D. Grandi (Ferrara), M. Kružík (Prague), and J. Zeman (Prague).

16:20-16:50 Coffee Break

16:50-17:30 ALAIN MIRANVILLE, “Cahn-Hilliard models with logarithmic nonlinear terms”

Abstract: Our aim in this talk is to discuss the Cahn-Hilliard equation and some of its variants with the physically relevant logarithmic nonlinear terms.

17:30-18:10 FRANCO BREZZI, “An overview on Virtual Element Methods”

Abstract: The talk will present the main ideas behind the Virtual Element Methods (VEMs), a recent instrument for the approximate solution of Partial Differential Equations. The main feature of VEMs is the use of decompositions (of the computational domain) into “elements” that have a much more general shape than the ones typically used in the more classical Finite Element Methods. The spaces of functions used to approximate the solution, inside each element, contain all the polynomials of a certain (chosen) degree, plus other functions that are solutions of suitable PDEs inside each element. The “name of the game” is to do all the necessary computations without solving these suitable PDEs. Needless to say, the regularity properties of these functions play nevertheless a crucial role in the proofs of convergence and error estimates.

The talk will be addressed mainly to an audience with little experience in Numerical Analysis, and possibly a better experience in more theoretical aspects of PDEs.

