Nadia Ansini (Bath and 'La Sapienza', Rome)

A variational approach to non-symmetric linear operators via Gamma-convergence

Abstract

We consider a sequence of Dirichlet problems for second order linear operator in divergence form where the matrices are uniformly elliptic and possibly non-symmetric. It is well known that if the matrices are symmetric, the equations have a variational structure since they can be seen as the Euler–Lagrange equations associated with a suitable sequence of functionals and the convergence of the solutions can be equivalently studied by means of the Gamma-convergence of the associated functionals or in terms of the G-convergence of the uniformly elliptic, symmetric matrices. In this seminar, we show that also in the non-symmetric case it is possible to give a variational structure to the equations of the aforementioned Dirichlet problems. We associate to every elliptic matrix a suitable quadratic integral functional and we consider the Gamma-convergence with respect to a suitable distance. We prove that the H-convergence of the non-symmetric matrices is equivalent to the Gamma-convergence of the corresponding functionals. In particular, we give an independent proof of the compactness of H-convergence, originally proved by Murat and Tartar, based on purely variational arguments. The results are obtained in collaboration with G. Dal Maso (SISSA) and C. I. Zeppieri (University of Munster).