

Date: Thursday July 09, 2026**Time:** 15:00 CET**Room:** Aula S04 de la FME (UPC)

H -convergence and Γ -convergence in the Riesz fractional setting: the nonlinear case

Alberto Maione
Politecnico di Milano

In this talk we present recent results on the H -convergence of nonlocal elliptic PDEs driven by monotone operators and on the Γ -convergence of the associated energy functionals in the framework of the Riesz fractional gradient and divergence. The first part of the talk is devoted to the relation between local and nonlocal monotone elliptic equations. We show that, for a suitable class of nonlinear operators, H -convergence in the local setting is equivalent to the corresponding notion of H -convergence in the fractional framework. As a consequence, we obtain an H -compactness result for the class of nonlocal operators under consideration. In the second part, we identify a natural subclass of monotone operators associated with energy functionals and investigate the relation between H - and Γ -convergence in the nonlocal setting. We prove that the Γ -convergence of the associated nonlocal energies is equivalent to the Γ -convergence of their local counterparts, yielding in particular a Γ -compactness result. Finally, we extend the classical equivalence between H - and Γ -convergence, known in the local linear theory, to both the local and nonlocal nonlinear settings.

This research is partially supported by the CRM-Barcelona International Program for Research in Groups “A Mathematical Approach to the Homogenization of Nonlocal Composite Materials: H -convergence, G -convergence, and Γ -convergence”. This is a joint project in collaboration with: Giuseppe Cosma Brusca (SISSA), Maicol Caponi (University of L’Aquila), Alessandro Carbotti (University of Salento) and Fabio Paronetto (University of Padua).