

Equazioni differenziali in Ancona – 28 Gennaio 2025

14:45 – 15:00	Apertura (Room 155/B, DIISM)
15:00 – 15:40	Irene Benedetti (UniPg) <i>“Nonlocal differential problems in abstract spaces”</i>
15:45 – 16:25	Gianmarco Giovannardi (UniFi) <i>“The asymptotic p-Poisson equation as $p \rightarrow \infty$ in Carnot-Carathéodory spaces”</i>
16:30 – 17:10	Gianni Pagnini (BCAM & Ikerbasque) <i>“Fractional differential equations in first-passage time problems for non-Markovian random walks”</i>

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- **I. Benedetti: “Nonlocal differential problems in abstract spaces”**

In this talk we will present results of existence and localization of solutions for nonlocal differential problems in abstract spaces. A focus will be given to techniques that allow weakening the classical compactness assumptions often found in the literature for studying differential equations in abstract spaces using topological methods, with an emphasis on a procedure based on fixed point theorems associated with the so-called transversality conditions. This technique provides a unifying method for studying models describing reaction-diffusion processes in several frameworks. We will consider nonlocal initial conditions such as the Cauchy multipoint and the mean value conditions, and we can handle nonlinearity with superlinear growth, for instance cubic polynomials or maps depending on the integral of the solution, thus encompassing nonlocal diffusion behaviours.

- **G. Giovannardi: “The asymptotic p -Poisson equation as $p \rightarrow \infty$ in Carnot-Carathéodory spaces”**

In this talk we will deal with the asymptotic behavior of solutions to the subelliptic p -Poisson equation as $p \rightarrow \infty$ in Carnot Carathéodory spaces. In particular, introducing a suitable notion of differentiability, we extend the celebrated result of Bhattacharya, DiBenedetto and Manfredi [Rend. Sem. Mat. Univ. Politec. Torino, Special Issue 1989, 15–68] and we prove that limits of such solutions solve in the sense of viscosity a hybrid first and second order PDE involving the ∞ -Laplacian and the Eikonal equation. This is a joint work with L. Capogna, A. Pinamonti and S. Verzellesi.

- **G. Pagnini: “Fractional differential equations in first-passage time problems for non-Markovian random walks”**

Non-Markovian continuous-time random walk (CTRW) on homogeneous space in the uncoupled formulation are considered. Non-Markovianity is set by a power-lawed waiting-time density providing an infinite-mean waiting-time. The evolution equations for the survival probability and for the first-passage time density are derived. The evolution equation for the survival probability results in a time-fractional equation in the Caputo sense while that for the first-passage time density results in the same equation but in the Riemann--Liouville sense. This difference implies related issues about the initial conditions. The relation between the solutions in the Markovian and non-Markovian settings for both equations is also established.