



DEPARTAMENTO DE
ANÁLISIS MATEMÁTICO Y
MATEMÁTICA APLICADA



Facultad de Ciencias
MATEMÁTICAS



Instituto de
Matemática
Interdisciplinar

SEMINARIO DE ANÁLISIS MATEMÁTICO Y MATEMÁTICA APLICADA

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PDEs and Wasserstein spaces

Wasserstein spaces were introduced for the optimal transport problem, where the aim is to "transport" one probability measure into another while optimising a cost functional. Soon, people realised that they are a natural framework for some first order PDEs and particle systems, as the Sobolev space are for elliptic and parabolic problems. In fact, through the Benamou-Brenier formula this kind of equations characterise the Wasserstein distance itself. More general PDEs (like the Keller-Segel problem or the Aggregation-Diffusion Equation) can be understood as gradient flows in these spaces.

This field has been tremendously successful as shown by the works of Fields Medallists C. Villani (2010) and A. Figalli (2018).

In this talk we will introduce these Wasserstein spaces and show some of the classical connections to PDEs mentioned above. We will also present some new results from the preprint "Interpreting systems of continuity equations in spaces of probability measures through PDE duality", joint work with J.A. Carrillo (U. of Oxford).

**Organizado por el Departamento de Análisis Matemático y
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Facultad de CC. Matemáticas-UCM