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Optimal transport tools for PDEs : the example of macroscopic crowd motion models

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In 1998, Jordan, Kinderlehrer and Otto proposed an approximation scheme for the Fokker-Planck equation that gives a very elegant interpretation of this PDE as a gradient flow in a certain metric space : the Wasserstein space. Thanks to this publication, the PDE community discovered a way of using optimal transport tools and gradient flow theory for a large class of PDEs, raising a certain interest for what has been referred to as the JKO scheme ever since. However, it appears that the historical examples of PDEs that first were interpreted as a gradient flow in the Wasserstein space - such as the Fokker-Planck equation or the heat equation - do not require for their study to been seen as such, raising the question of the use of this interpretation. During this talk, we will focus on the specific example of certain crowd motion models that yield some new type of PDEs, for which the JKO approach allowed a huge breakthrough.

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