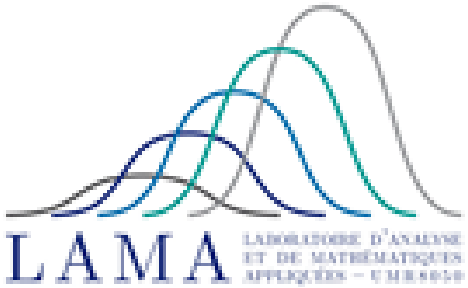
Journée EDP du LAMA 2026



Rapport sur les contributions

https://indico.math.cnrs.fr/e/jedp.lama.2026

ID de Contribution: **3** Type: **Non spécifié**

Categorical transfer between linear operators

jeudi 19 mars 2026 10:00 (1 heure)

In this talk, I will present an ongoing work whose purpose is to develop a general new method to transfer properties of a linear operator to another. The initial idea was to transfer a Runge approximation property from the Laplace operator to the Stokes operator, by proceeding in several stages, transferring information back and forth by the means of 3 identities, which involve auxiliary operators which are all local. Yet, it turned out that such a strategy can be extended to the transfer of various properties, such as Fredholmness, local solvability, hypoellipticity, unique continuation and controllability. We will see how categorical language may describe, in a unified way, such transfers, by identifying auxiliary operators, involved in combinations of up to 6 specific identities, as morphisms between two given operators. Such "transfer categories" can then be tailored to different contexts and needs in algebra, functional analysis, and PDEs.

Orateur: SUEUR, Franck (DMATH, University of Luxembourg)

ID de Contribution: **4** Type: **Non spécifié**

Resonances as a Computational Tool

jeudi 19 mars 2026 11:15 (1 heure)

A large toolbox of numerical schemes for dispersive equations has been established, based on different discretization techniques such as discretizing the variation-of-constants formula (e.g., exponential integrators) or splitting the full equation into a series of simpler subproblems (e.g., splitting methods).
In many situations these classical schemes allow a precise and efficient approximation. This, however, drastically changes whenever non-smooth phenomena enter the scene such as for problems at low regularity and high oscillations. Classical schemes fail to capture the oscillatory nature of the solution, and this may lead to severe instabilities and loss of convergence.
In this talk I present a new class of resonance based schemes. The key idea in the construction of the new schemes is to tackle and deeply embed the underlying nonlinear structure of resonances into the numerical discretization. As in the continuous case, these terms are central to structure preservation and offer the new schemes strong geometric properties at low regularity.

Orateur: SCHRATZ, Katharina

ID de Contribution: **5** Type: **Non spécifié**

On a conjecture of E. De Giorgi for Mumford–Shah minimizers

jeudi 19 mars 2026 13:45 (1 heure)

In a 1991 paper, E. De Giorgi formulated a series of nine conjectures concerning the now well-known Mumford–Shah functional, some of which remain open to this day. Among them, Conjecture 2 states that, in dimension N, the number of possible limit values of a minimizer as approaching its singular set should be less than or equal to N+1. In this talk, I will describe how to give a positive answer to this question in dimension 2, using tools developed by G. David, A. Bonnet, and J.-C. Léger in the 2000s. This work is part of a recent collaboration with Camille Labourie (Université de Lorraine, Nancy). We will then discuss to what extent this result can be (partially) extended to the Griffith functional, which arises in models of crack propagation and motivates ongoing work in collaboration with Camille Labourie and Lorenzo Lamberti (both at Université de Lorraine, Nancy).

Orateur: LEMENANT, Antoine

ID de Contribution: **6** Type: **Non spécifié**

Unbounded solutions to the two dimensional Euler equations

jeudi 19 mars 2026 15:00 (1 heure)

I report on joint work with D. Cobb. We consider unique global in time solutions to the two dimensional Euler equations with initial data with sublinear growth and bounded vorticity. An easy check shows that the Leray projection to divergence free vector fields cannot be defined in this setting. Instead we construct unique solutions for which the velocity at x=0 vanishes for all times. This is possible by the Galilean invariance.

Orateur: KOCH, Herbert