

## **Partial Differential Equations in Thin Domains**

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In this talk, we will explore results related to parabolic and elliptic equations defined in thin domains. We will begin by examining the pioneering work of Hale and Raugel (JDE, 1992) in the context of parabolic equations. From there, we will move to more recent developments where Homogenization Theory plays a crucial role in analyzing the asymptotic behavior of solutions as a domain in Euclidean space degenerates into an interval.

## **Eigenvalue asymptotics for two dimensional magnetic Dirac operators**

**Pablo Miranda**, Vincent Bruneau

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In this talk, we present results on the eigenvalue distribution for perturbed magnetic Dirac operators in two dimensions. We consider compactly supported perturbations and derive third order asymptotic formulas that incorporate a geometric property of the perturbation's support. Notably, our approach allows us to consider some perturbations that do not necessarily have fixed sign, which is one of the main novelties of our work. This is part of a joint work together with Vincent Bruneau.

## **Elliptic semilinear problems in thin domains defined by non-negative functions**

**Patrícia Neves de Araújo**, Marcone Corrêa Pereira, Jean Carlos Nakasato

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In this work, we investigate the behavior of the solutions of a semilinear elliptic equation posed in a thin domain with an outward peak given by a nonnegative function. We apply standard methods from asymptotic analysis and thin domains to show the strong convergence of the solutions of the linear problem and determine its rate of convergence. We also derive conditions under which the linear limit equation has a compact resolvent in order to analyze the semilinear equation. We obtain upper and lower semicontinuity of the solutions and establish the rate of convergence under appropriated conditions on the geometry of the thin domain.

## **On the upper semicontinuity of global attractors of parabolic equations with dynamic boundary conditions**

**Pedro T. P. Lopes**, Leonardo Pires

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Using form methods and analytic semigroup theory, we show how to prove the existence and upper semi-continuity of global attractors of a family of parabolic and elliptic second-order elliptic equations with dynamic boundary conditions. We consider perturbations of the coefficients as well as perturbations of the domains.