

SEMINÁRIO DO GRUPO DE FÍSICA MATEMÁTICA

Dia 10 de Janeiro (quarta-feira), às 11h00, sala 6.2.33

Nonlinear higher-order eigenvalue problems: positivity of first eigenfunctions and validity of the Faber-Krahn inequality

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Abstract: Higher-order eigenvalue problems are known to present some additional difficulties with respect to their second-order counterparts. The lack of a maximum principle does not allow to conclude that first eigenfunctions are positive (or negative), and indeed they can be sign-changing in some cases. Similarly, standard symmetrization techniques can not be applied, so that it is not easy to identify the domain which minimizes the first eigenvalue under a volume constraint. In this talk we will present some results about the minimization of the L^1 (resp. the L^∞) norm of the Laplacian among functions with fixed L^1 (resp. L^∞) norm, which amounts to find the first eigenvalue of some nonlinear higher-order differential operators. In particular, we will present results about the positivity of first eigenfunctions, and the validity of the Faber-Krahn inequality, namely, when the domain which minimizes the first eigenvalue under a volume constraint is the ball. The results have been obtained in collaboration with Nikos Katzourakis (Reading, UK), Bernhard Ruf and Cristina Tarsi (Milan, Italy).