

# The Bilaplacian with Robin boundary conditions

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**Abstract:** In this talk we present a new type of boundary conditions for the Bilaplacian, that we will call Robin boundary conditions. This new problem can be thought of as a model for elastically supported plates, and moreover turns out to be closely related to the study of spaces of traces of Sobolev functions. We will start by recalling some known properties of the Robin Laplacian as a motivation for its fourth-order counterpart, then we will introduce the Robin Bilaplacian operator. We will then analyze the dependence of the operator, its eigenvalues, and eigenfunctions on the Robin parameters, with a particular focus on the asymptotics as the parameters tend to infinity. We will conclude by considering the dependence on smooth perturbations of the domain, computing the shape derivatives of the eigenvalues and giving a characterization for critical domains under volume and perimeter constraints.  
Based on a joint work with J. Kennedy.