



THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

Undergraduate Research Seminar

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3:30 - 4:30 p.m.
Zoom

Nodal domain count for eigenfunctions of dumbbell domains

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Abstract. The eigenvalues and eigenfunctions of the Laplacian of a plate determine the constant frequencies at which the plate can vibrate. The zero set of the eigenfunction then corresponds to the curves on the plate that are stationary as the plate vibrates at that frequency. This zero set partitions the plate into a finite number of connected components called nodal domains, and the Courant nodal domain theorem provides an upper bound on their number. In this talk, we will discuss properties of the nodal domains of eigenfunctions of rectangular dumbbell domains, which consist of two rectangles joined by a thin neck. In particular, we will construct examples of eigenfunctions of dumbbell domains that give equality in the Courant nodal domain theorem. This is joint work with Joseph Denham.