

# **A Morse Index Theorem for Elliptic Operators on Bounded Domains.**

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## **Abstract.**

With Graham Cox and Chris Jones, we study second-order, self-adjoint elliptic operators on a smooth one-parameter family of domains without any assumptions on the symmetry. It will follow that the Morse index for the elliptic operator can be related to the Maslov index of an appropriately defined path in a symplectic Hilbert space defined on the boundary. Specifically, the Maslov index of the path we define relates the Morse index of the initial domain to the Morse index of the final domain. This is particularly useful when the domain can be taken to have arbitrarily small volume, because the spectral problem is particularly simple in that case. This generalizes previous results of Deng-Jones that were only available on star-shaped domains, or for Dirichlet boundary conditions. With the Morse index theorem in hand, we will also explore several higher dimensional applications in stability theory.

This is a joint work with G. Cox, C. Jones, R. Marangell, A. Sukhtayev, and S. Sukhtaiev.