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A bound for the eigenvalue counting function for Krein-von Neumann extensions for elliptic second-order partial differential operators on bounded sets

For arbitrary open, bounded, n-dimensional sets Ω, we consider strictly positive second-order differential operators with sufficiently smooth coefficients defined on $W_0^{2,2}(\Omega)$ and their Krein-von Neumann extension in $L^2(\Omega)$. We derive a bound for the eigenvalue counting function corresponding to such extensions.

Our method of proof relies on variational considerations exploiting the fundamental link between the Krein-von Neumann extension and an underlying abstract buckling problem, and on the distorted Fourier transform defined in terms of the eigenfunction transform of a naturally associated operator in $L^2(\mathbb{R}^n)$.

We also consider the analogous bound for the eigenvalue counting function for the Friedrichs extension and certain higher-order operators. No assumptions on the boundary of the set Ω are made.

This is based on joint work with M. Ashbaugh, A. Laptev, M. Mitrea, and S. Sukhtaiev.