Semiclassical bounds for spectra of biharmonic operators

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We consider Riesz means of the eigenvalues of the biharmonic operator subject to various boundary conditions, and we improve the known sharp semiclassical bounds in terms of the volume of the domain with a second term with the expected power. We obtain such estimates by means of the averaged variational principle. This method intrinsically also yields two-sided bounds for individual eigenvalues, which are semiclassically sharp.

Based on a joint work with L. Provenzano and J. Stubbe.