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What does the average eigenvalue know ?

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Abstract : The average of the first k eigenvalues of a self-adjoint operator, as a function of k , has implications for inverse problems. What information does it contain about the shape of a domain or the structure of a graph on which the operator is defined ? I'll describe some recently developed tools for approaching inverse problems through averages of operators, with selected applications to the spectra of operators on domains and graphs.

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