The Morse and Maslov indices for periodic and for multidimensional differential operators.

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Abstract.

In this talk we discuss some recent results on connections between the Maslov and the Morse indices for Schroedinger differential operators. The Morse index is a spectral quantity defined as the number of negative eigenvalues counting multiplicities while the Maslov index is a geometric characteristic defined as the signed number of intersections of a path in the space of Lagrangian planes with the train of a given plane. The problem of relating these two quantities is rooted in Sturm's Theory and has a long history going back to the classical work by Arnold, Bott, Duistermaat, Smale, and to a more recent paper by Deng and Jones. Two situations will be addressed: First, the case when the differential operator is a one dimensional Schroedinger operator equipped with theta-periodic boundary conditions, and second, when the Schroedinger operators are acting on a family of multidimensional domains obtained by shrinking a star-shaped domain to a point and are equipped with either Dirichlet or quite general Robbin boundary conditions.

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