

**OSCILLATION AND SPECTRAL THEORY OF CONTINUOUS
HAMILTONIAN AND DISCRETE SYMPLECTIC SYSTEMS
WITH APPLICATIONS**

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We consider continuous Hamiltonian differential and discrete symplectic eigenvalue problems with Dirichlet boundary conditions. We present the basic results on these eigenvalue problems in both cases, continuous and discrete, which are the *Oscillation Theorem*, *Rayleigh's Principle*, *Existence* of eigenvalues, the *Expansion Theorem* and *Completeness* of the eigenfunctions. The main tools for the proofs (within a unified setting/notion and theory for both cases) will be discussed, in particular: *Picone's Identity*, *l'Hospital's Rule* for matrices, and an *Index Theorem* for monotone matrixvalued functions. Concluding we present two applications.