Yiming Long
Index Theory for Symplectic Paths with Applications

This book gives a systematic introduction to the index theory for symplectic matrix paths and its iteration theory, as well as applications to periodic solution problems of nonlinear Hamiltonian systems. Among the topics covered are the algebraic and topological properties of symplectic matrices and groups, the index theory for symplectic paths, relations with other Morse-type index theories, Bott-type iteration formulae, splitting numbers, precise index iteration formulae, various index iteration inequalities, and common index properties of finitely many symplectic paths. The applications of these concepts yield new approaches to some outstanding problems and important progress on their solutions. Particular attention is given to the minimal period solution problem of Hamiltonian systems, the existence of infinitely many periodic points of the Poincaré map of Lagrangian systems on tori, and the multiplicity and stability problems of closed characteristics on convex compact smooth hypersurfaces in $2n$-dimensional euclidean vector space.

Researchers, graduate and postgraduate students from a wide range of areas inside mathematics or physics will benefit from this monograph. Teachers of advanced courses in symplectic geometry or Hamiltonian systems will also find it an excellent textbook

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