

**Atiyah-Patodi-Singer index theory I: A primer
on index theorems on manifolds with and
without boundary**

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Abstract:

Seminal work of M. F. Atiyah and I. M. Singer in the 1960s lead them to a first theorem relating indices of differential operators on closed smooth manifolds to topological properties in great generality. Considering the classical signature and the Dirac operator, one obtains specifically important conclusions. In subsequent papers in collaboration with V. K. Patodi they established a generalization to compact manifolds with boundary, which gave rise to a remarkably rich set of invariants. This first talk will cover the classical theorems and interesting applications in geometry and topology thereby laying the foundation to survey resulting invariants in a second talk.

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