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 - 題目 Continuous Variation of Cauchy Data Spaces
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(DVI file)

Generalizing approaches due to M. Morse and A. Floer, there have been various formulas expressing the spectral flow of a curve of selfadjoint elliptic operators, typically of Dirac operator type, on a partitioned manifold by the Maslov index of the induced curve of Cauchy data spaces along the separating hypersurface. In this talk, we

- (1) sketch the history of the problem;
- (2) derive the continuous variation of Cauchy data spaces from the smooth variation of the coefficients;
- (3) summarize the geometric consequences; and
- (4) outline the remaining challenging and unsolved problems.

The main emphasis of my talk will be on (2), which is the necessary prerequisite for all such spectral flow formulas. To do that, we assume the weak inner unique continuation property and one additional assumption out of two alternatives: **either** we shall demand the symmetry of the induced tangential operators along the separating hypersurface and admit arbitrary variation **or** we shall admit non-symmetric tangential operators but restrict to 0th order variation. The results were obtained in joint work with Matthias Lesch (Bonn) and Chaofeng Zhu (Tianjin) and are based on

- a new construction of the invertible double of an elliptic operator on a compact manifold with smooth boundary,
- a related new construction of the Calder $\{o\}$ n projection, yielding a generalization and a new proof of the Cobordism Theorem, and
- a rather delicate analysis of sectorial projections for non-selfadjoint operators.



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