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50 years of Atiyah-Singer index theory - Summary and recollections

ZEIT:
18.6.2013, 15:30 Uhr - 16:30 Uhr

ORT:
Humboldt-Universität zu Berlin
Institut für Mathematik
Raum 1.013
Rudower Chaussee 25
12489 Berlin

Vortrag im Rahmen des Forschungsseminars "Geometrische Analysis und Spektraltheorie"

In May 1963, the Bulletin of the American Mathematical Society published a 12 pages announcement by M.F. Atiyah and I.M. Singer that they had found and proved a formula for the index of elliptic operators. In the seminar, I shall outline the content of the formula in its different versions; comment on the various proof strategies; explain some of the predecessors, going back to Niels Abel’s work of 1826 on the numerical complexity of elliptic integrals; summarize the most spectacular applications of index theory in low-dimensional topology; and conclude with a personal view upon the inherent limitations of index theory.

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