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*A Hirzebruch-Riemann-Roch theorem for differential operators*

Let $E$ be a holomorphic vector bundle over a compact complex manifold $X$. The Hirzebruch Riemann-Roch theorem computes the Euler characteristic of $E$ in terms of its Chern character and the Todd class of the tangent bundle of $X$. To be precise,

$$
\chi(X, E) = \int_X \text{ch}(E) \cdot \text{td}(T_X).
$$

Every holomorphic differential operator $D$ on $E$ induces endomorphisms on each cohomology of $X$ with coefficients in $E$. The alternating sum of the traces of these endomorphisms yields the supertrace (or Lefschetz number) of $D$. Note that the supertrace of the identity on $E$ is precisely the Euler characteristic of $E$. In recent times, a Hirzebruch Riemann-Roch theorem for differential operators has been proven by at least two different approaches. This result says that the Lefschetz number of $D$ is the integral over $X$ of a class in the top cohomology of $X$ constructed out of $D$. In this talk, I shall sketch one of the approaches to this result. This result provides a direct bridge between the algebraic index theorem of Bressler, Nest and Tsygan and the Hirzebruch Riemann-Roch theorem.