

Virtual Riemann Roch (RR) Theorems

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This talk reports on current and past joint work with Lothar Göttsche, as well as related, previous work by I. Ciocan-Fontanine and M. Kapranov.

In modern algebraic geometry Hirzebruch-RR is usually proven as a special case of Grothendieck RR, when the target is a point. Ciocan-Fontanine and Kapranov have proven Grothendieck RR for a morphism from a quasiprojective 1-dg-manifold to a smooth manifold; Göttsche and I proved a similar result under the weaker assumption that the domain be a scheme embeddable in a smooth scheme and having a perfect obstruction theory.

Although this special case already has applications (via Hirzebruch RR), it is nonetheless unsatisfactory. In current work, we study morphisms having a relative perfect obstruction theory, and prove Grothendieck RR for some of them; the approach we take is related to Manolache's construction of an orientation class for such morphisms. As a result, we expect to get an extension of the original result to the case where the domain is not a scheme but a Deligne-Mumford stack. The proof is close to Fulton's proof of Grothendieck RR and relies on the definition of a virtual blowup.