

# Queen's Algebraic Geometry — Seminar —

## DIMENSION FORMULAS FOR MODULAR FORMS ON ORTHOGONAL LOCALLY SYMMETRIC SPACES

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### Abstract

This talk will be a status report on a long term project on which I have been working. The goal of the project is to find dimension formulas for spaces of modular forms on Shimura varieties of orthogonal type. Rephrased geometrically, we wish to find the dimensions for the spaces of global sections of the bundles  $\mathcal{O}(k)$  for certain natural moduli spaces (for example: K3-surfaces +additional structures). The strategy we employ is to directly use the Hirzebruch-Riemann-Roch formula. However, as we do not know how to compute any of the Chern classes of our variety, we must find other means to allow us to evaluate the universal formula which the Hirzebruch-Riemann-Roch theorem gave us. This talk will summarize what we have been able to do. In particular, we will

- introduce the variety and line bundle we wish to study;
- explain how we use various tools (Hirzebruch-Mumford proportionality, logarithmic Chern classes, toric varieties, Leray spectral sequence, projection formula, cohomology and base change, etc.) to formally massage the Hilbert polynomial, into terms we can hope to understand;
- explain the shape of the formula we expect to obtain in the general case; and
- discuss the difficulties which still remain.

Monday 10 November 2014  
16:30–17:30  
319 Jeffery Hall