Atelier
« Le programme Kudla »
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Workshop
"The Kudla programme"
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Modular generating series and arithmetic geometry

Stephen Kudla*

skudla@math.utoronto.ca

I will survey the development of the theory of theta series and describe some recent advances/work in progress on arithmetic theta series. The construction and modularity of theta series as counting functions for lattice points for positive definite quadratic forms is a beautiful piece of classical mathematics with its origins in the mid 19th century. Siegel initiated the study of the analogue for indefinite quadratic forms. Millson and I introduced a geometric variant in which the theta series give rise to modular generating series for the cohomology classes of "special" algebraic cycles on locally symmetric varieties. These results motivate the definition of analogous generating series for the classes of such special cycles in the Chow groups and for the classes in the arithmetic Chow groups of their integral extensions. The modularity of such series is a difficult problem. I will discuss various cases in which recent progress has been made and some of the difficulties involved.

*Department of Mathematics, University of Toronto, 40 St. George Street, Toronto, ON M5S 2E4, CANADA.