PRAIRIE MATHEMATICS COLLOQUIUM

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Periods in number theory and algebraic geometry

Mathematics and Statistics

Date: Thursday January 26, 2023
Time: Tea social at 2:00 PM, talk at 2:30 PM
Zoom link: https://usask-ca.zoom.us/j/92622240845?pwd=cHBaV0Z4NWU0eVdvMGlWRlZuRTIzZz09

Abstract: Periods are numbers that arise as integrals of rational functions with coefficients in $\mathbb{Q}$ over sets that are cut out by polynomial inequalities with coefficients in $\mathbb{Q}$. More conceptually, periods are numbers that arise from the natural isomorphism between the singular and algebraic de Rham cohomologies of algebraic varieties (or more generally, singular and de Rham realizations of motives) over $\mathbb{Q}$.

Examples of periods include algebraic numbers, π, $\log(2)$ and other special values of the logarithm function, and special values of the Riemann zeta function (or more generally, multiple zeta values). It is expected that every algebraic relation between periods should "come from geometry": this is the moral of Grothendieck's period conjecture, a very deep and fascinating conjecture of Grothendieck that connects number theory with geometry.

The goal of this talk is to give an introduction to periods and Grothendieck's period conjecture. In the final part of the talk we will describe some recent related work (joint with K. Murty).

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