

Algebraic cycles, p-adic L-functions, and the oscillator representations

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A classical arithmetic problem is that of finding and classifying rational solutions (or families thereof) to systems of polynomial equations. If one linearizes it to allow combinations of solutions (algebraic cycles), the problem can be decomposed based on ‘motives’. I will introduce some ‘canonical’ algebraic cycles for high rank motives with a similar symmetry to elliptic curves.

The cycles arise from Shimura varieties via the oscillator representation of Segal and Weil. Under some conditions, one can relate their nontriviality to L-functions and show that, if nontrivial, there are ‘no other cycles’. This supports analogues of the Birch and Swinnerton-Dyer conjecture. (Partly based on joint work with Yifeng Liu.)

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