Darmon points on modular abelian varieties over totally real fields

Xevi Guitart\textsuperscript{1}, Marc Masdeu\textsuperscript{2}, Santiago Molina\textsuperscript{3}

Let $A$ be a modular abelian variety over a totally real field $F$ and let $K/F$ be a quadratic extension. If $K/F$ is totally imaginary, the theory of complex multiplication provides a construction of certain special points on $A$. These so-called Heegner points give rise to partial approaches to the Birch and Swinnerton-Dyer conjecture.

In this talk, we present new conjectural constructions of special points on $A$ attached to non-CM extensions $K/F$. Such constructions generalize [1], [2], [3], [4] and the classical construction of Heegner points. We predict the Galois action on such points, called Stark-Heegner or Darmon points, and its connection with the Birch and Swinnerton-Dyer conjecture. Our conjectures are supported by many numerical evidence.

References

[1] H. Darmon, Integration on $\mathfrak{H}_p \times \mathfrak{H}$ and arithmetic applications. \textit{Ann. of Math.} (2), 154(3):589639, 2001

\textsuperscript{1}Department de matèmatics, Universitat de Barcelona, Gran via de les Corts Catalanes, 585 08007 Barcelona (Spain)
xevi.guitart@gmail.com

\textsuperscript{2}Mathematics Department, University of Warwick, Warwick Mathematics Institute Zeeman Building Coventry, CV4 7AL (United Kingdoms)
m.masdeu@warwick.ac.uk

\textsuperscript{3}Centre de Recerca Matemàtica, Campus de Bellaterra, Edifici C 08193 Bellaterra (Spain)
smolina@crm.cat