

# 國立清華大學數學系學術演講

## NTHU MATH Colloquium

講題 Elliptic curves and zeta functions

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時間 2020.11.02 (Mon.) 16:00 – 17:00

地點 Room 101, General Building III

茶會 15:30, R707

### Abstract

The Birch and Swinnerton-Dyer conjecture, one of the Clay millennium problems, describes the size of the set of rational solutions to equations defining an elliptic curve  $E$  in terms of the analytic rank of the associated zeta function  $L(E,s)$ , where the analytic rank of  $E$  is the order of the vanishing of  $L(E,s)$  at  $s=1$ . Number theorists have made tremendous progress when the analytic rank is less than or equal to one, but people know little in the case of higher ranks. The most crucial ingredient in the small rank case is the existence of Heegner points in elliptic curves over imaginary quadratic fields, but unfortunately these points always vanish when the rank is bigger than one. In this talk, we will introduce a new object "diagonal cycle classes" associated with elliptic curves and imaginary quadratic fields and explain why they may serve a potential replacement of Heegner points in the rank two case. This is a joint work with Francesc Castella.