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The anticyclotomic main conjecture for elliptic curves at supersingular primes. (English)

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Let E be an elliptic curve over \mathbb{Q} of conductor N_0 . Let K be an imaginary quadratic field of discriminant prime to N_0 . Chose a rational prime p and let K_∞ denote the anticyclotomic \mathbb{Z}_p -extension of K . The anticyclotomic main conjecture of Iwasawa theory in the ordinary case was studied by *M. Bertolini* and *H. Darmon* in [Ann. Math. (2) 162, No. 1, 1–64 (2005; Zbl 1093.11037)]. Let \mathcal{C} be the characteristic power series of the Pontryagin dual of the Selmer group $\text{Sel}(K_\infty, E_{p^\infty})$ (we put $\mathcal{C} = 0$ if $\text{Sel}(K_\infty, E_{p^\infty})^\wedge$ is not torsion over the Iwasawa algebra Λ) and let $L_p(E, K)$ denote the p -adic L -function. They proved (under certain technical hypotheses) that $\mathcal{C} | L_p(E, K)$ in Λ .

The authors of this paper formulate and prove analogous results in the case where p is a prime of supersingular reduction. The foundational study of supersingular main conjecture carried out by Perrin-Riou, Pollack, Kurihara, Kobayashi, Iovita and others, are required to handle this case in which many of the simplifying features of the ordinary setting break down. In this case we have two p -adic L -functions $L_p^\pm(E, K)$ and two restricted Selmer groups. The main conjecture in this case is formulated as follows: the characteristic power series \mathcal{C}^+ and \mathcal{C}^- generate the same ideal of the Iwasawa algebra Λ as the p -adic L -functions $L_p^+(E, K)$ and $L_p^-(E, K)$ respectively. The main result of this article (Theorem 1.4) says that, under certain technical hypothesis, $\mathcal{C}^+ | L_p^+(E, K)$ and $\mathcal{C}^- | L_p^-(E, K)$.

Reviewer: [Andrzej Dąbrowski \(Szczecin\)](#)

MSC:

11R23 Iwasawa theory

11G05 Elliptic curves over global fields

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Keywords:

elliptic curves; supersingular reduction; Iwasawa theory; main conjecture; p -adic L -functions; Selmer group; Euler system

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