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DERIVED HEIGHTS AND GENERALIZED MAZUR-TATE REGULATORS

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1. Introduction. Let E be an elliptic curve defined over a number field K, and let L/K be an abelian extension with Galois group G. In [MT1] and [MT2], B. Mazur and J. Tate have defined a height pairing

$$\langle\ ,\ \rangle_{MT}: E_L(K) \times E(K) \to G,$$

where $E_L(K)$ is a subgroup of finite index of $E(K)$, consisting of the points of $E(K)$ that are local norms from $E(L)$. Let I denote the augmentation ideal in the integral group ring $\mathbf{Z}[G]$. There is a canonical identification $G = I/I^2$, allowing us to

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