

ℓ vs. p in Iwasawa theory

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Iwasawa theory studies arithmetically significant modules associated with \mathbb{Z}_p -extensions K/k of global fields, i.e. Galois extensions with Galois group isomorphic to the p -adic integers (p a prime). For example it provides a formula for the order of the p -part of the class groups of the finite subextensions of K/k . Regarding the ℓ -part ($\ell \neq p$ another prime), very few results are available, mainly obtained via analytic methods and for specific \mathbb{Z}_p -extensions. We present an algebraic approach to investigate those ℓ -groups: it uses a description of the Iwasawa algebra $\Lambda = \mathbb{Z}_\ell[[\mathbb{Z}_p]]$ to provide structure theorems for Λ -modules, and to study ℓ -parts of general Iwasawa modules, e.g. Selmer groups associated with algebraic varieties. (This is joint work with I. Longhi)