

Classifying Possible Density Degree Sets for Hyperelliptic Curves

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Abstract: Let C be a smooth, projective, geometrically integral hyperelliptic curve of genus $g \geq 2$ over a number field k . To study the distribution of degree d points on C , we introduce the notion of \mathbb{P}^1 - and AV-parameterized points, which arise from natural geometric constructions. These provide a framework for classifying density degree sets, an important invariant of a curve that records the degrees d for which the set of degree d points on C is Zariski dense. Zariski density has two geometric sources: If C is a degree d cover of \mathbb{P}^1 or an elliptic curve E of positive rank, then pulling back rational points on \mathbb{P}^1 or E give an infinite family of degree d points on C . Building on this perspective, we give a classification of the possible density degree sets of hyperelliptic curves.

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