

Homma, Masaaki

Fragments of plane filling curves of degree $q + 2$ over the finite field of q elements, and of affine-plane filling curves of degree $q + 1$. (English) [Zbl 1439.14082](#)

[Linear Algebra Appl.](#) 589, 9-27 (2020).

Summary: Nonsingular plane curves over a finite field \mathbb{F}_q of degree $q + 2$ passing through all the \mathbb{F}_q -points of the plane admit a representation by 3×3 matrices over \mathbb{F}_q . We classify their degenerations by means of the matrix representation. We also discuss the similar problem for the affine-plane filling projective curves of degree $q + 1$.

MSC:

- [14G15](#) Finite ground fields in algebraic geometry
- [14H50](#) Plane and space curves
- [14G05](#) Rational points
- [11G20](#) Curves over finite and local fields

Keywords:

[plane curve](#); [finite field](#); [rational point](#)

Full Text: [DOI](#)

References:

- [1] Duran Cunha, G., Curves containing all points of a finite projective Galois plane, *J. Pure Appl. Algebra*, 222, 2964-2974 (2018) · [Zbl 1428.14052](#)
- [2] Gantmacher, F. R., *The Theory of Matrices*, vol. 1 (1998), AMS Chelsea Publishing: AMS Chelsea Publishing Providence, (Translated from the Russian by K. A. Hirsch. Reprint of the 1959 translation.) · [Zbl 0927.15001](#)
- [3] Homma, M.; Kim, S. J., Sziklai's conjecture on the number of points of a plane curve over a finite field III, *Finite Fields Appl.*, 16, 315-319 (2010) · [Zbl 1196.14030](#)
- [4] Homma, M.; Kim, S. J., Toward determination of optimal plane curves with a fixed degree over a finite field, *Finite Fields Appl.*, 17, 240-253 (2011) · [Zbl 1215.14033](#)
- [5] Homma, M.; Kim, S. J., The uniqueness of a plane curve of degree q attaining Sziklai's bound over (\mathbb{F}_q) , *Finite Fields Appl.*, 18, 567-580 (2012) · [Zbl 1243.14024](#)
- [6] Homma, M.; Kim, S. J., Nonsingular plane filling curves of minimum degree over a finite field and their automorphism groups: supplements to a work of Tallini, *Linear Algebra Appl.*, 438, 969-985 (2013) · [Zbl 1259.14023](#)
- [7] Homma, M.; Kim, S. J., The second largest number of points on plane curves over finite fields, *Finite Fields Appl.*, 49, 80-93 (2018) · [Zbl 1411.11059](#)
- [8] Sziklai, P., A bound on the number of points of a plane curve, *Finite Fields Appl.*, 14, 41-43 (2008) · [Zbl 1185.14017](#)
- [9] Tallini, G., Le ipersuperficie irriducibili d'ordine minimo che invadono uno spazio di Galois, *Atti Accad. Naz. Lincei, Rend. Cl. Sci. Fis. Mat. Nat.* (8), 30, 706-712 (1961) · [Zbl 0107.38104](#)
- [10] Tallini, G., Sulle ipersuperficie irriducibili d'ordine minimo che contengono tutti i punti di uno spazio di Galois $(S_{r, q})$, *Rend. Mat. Appl.* (5), 20, 431-479 (1961) · [Zbl 0106.35604](#)

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.