

Homma, M.; Kim, S. J.; Komeda, J.

A semigroup at a pair of Weierstrass points on a cyclic 4-gonal curve and a bielliptic curve.
(English) [Zbl 1107.14024](#)
J. Algebra 305, No. 1, 1-17 (2006).

Let X be a nonsingular complex projective algebraic curve of genus $g \geq 2$ and let $\mathbb{C}(X)$ be the field of rational functions of X . The Weierstrass semigroup at $P \in X$ is the set $H(P)$ of nonnegative integers n such that there exists $f \in \mathbb{C}(X)$ which has nP as its pole divisor. In the same way one may define the Weierstrass semigroup at $P, Q \in X$ as being the set $H(P, Q)$ of pairs of nonnegative integers (n_1, n_2) such that there exists $f \in \mathbb{C}(X)$ which has $n_1P_1 + n_2P_2$ as its pole divisor.

In the present paper the authors study $H(P, Q)$ in the case where X is a cyclic 4-gonal curve. Assume that $P, Q \in X$ are total ramification points of the fixed cyclic 4-gonal map (then 4 is the least positive element of $H(P)$ and of $H(Q)$, moreover $4P$ and $4Q$ are linearly equivalent divisors), the authors determine all possible semigroups $H(P, Q)$ and show that every possibility indeed happens. They then proceed to analyse the case of bielliptic curves (i.e. double coverings of elliptic curves); for these curves there are points P and Q such that 4 is the least positive element in both $H(P)$ and $H(Q)$ but $4P$ and $4Q$ are not linearly equivalent. Again, they determine all possible semigroups $H(P, Q)$ and show that every possibility actually happens.

Reviewer: [Cicero Carvalho \(Uberlandia\)](#)

MSC:

[14H55](#) Riemann surfaces; Weierstrass points; gap sequences
[14H45](#) Special algebraic curves and curves of low genus

Cited in **3** Documents

Keywords:

Weierstrass semigroup of a pair of points; 4-gonal curves

Full Text: [DOI](#)

References:

- [1] Arbarello, E.; Cornalba, M.; Griffiths, P.A.; Harris, J., *Geometry of algebraic curves, vol. I*, (1985), Springer-Verlag · [Zbl 0559.14017](#)
- [2] Hartshorne, R., *Algebraic geometry*, (1977), Springer-Verlag · [Zbl 0367.14001](#)
- [3] Homma, M., The Weierstrass semigroup of a pair of points on a curve, *Arch. math.*, 67, 337-348, (1996) · [Zbl 0869.14015](#)
- [4] Kang, E.; Kim, S.J., Special pairs in the generating subset of the Weierstrass semigroup at a pair, *Geom. dedicata*, 99, 1, 167-177, (2003) · [Zbl 1019.14016](#)
- [5] Kim, S.J., On the index of the Weierstrass semigroup of a pair of points on a curve, *Arch. math.*, 62, 73-82, (1994) · [Zbl 0815.14020](#)
- [6] Kim, S.J.; Komeda, J., The Weierstrass semigroup of a pair and moduli in \mathcal{M}_g , *Bol. soc. brasil. mat.*, 32, 2, 149-157, (2001) · [Zbl 1077.14534](#)
- [7] Kim, S.J.; Komeda, J., Weierstrass semigroups of pairs of points whose first non-gaps are three, *Geom. dedicata*, 93, 1, 113-119, (2002) · [Zbl 1026.14007](#)
- [8] Komeda, J., On Weierstrass points whose first non-gaps are four, *J. reine angew. math.*, 341, 68-86, (1983) · [Zbl 0498.30053](#)
- [9] Park, J., A note on Weierstrass points of bielliptic curves, *Manuscripta math.*, 95, 33-45, (1998) · [Zbl 0915.14020](#)

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.