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A variant of a base-point-free pencil trick and linear systems on a plane curve. (English)

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Let X be a smooth plane curve of degree $d \geq 4$ and L an invertible sheaf of degree $sd - e$ with $1 \leq s < d - 3$ and $0 \leq e < d$ on X . Noether's theorem gives an upper bound of the dimension of the linear system $|L|$, namely

$$\dim |L| \leq r(s, e) := \begin{cases} \frac{1}{2}s(s+1) - 1 & \text{if } s+1 \leq e < d \\ \frac{1}{2}(s+1)(s+2) - e - 1 & \text{if } 0 \leq e \leq s+1. \end{cases}$$

The paper considers the case when the upper bound $r(s, e)$ is attained. In fact, with the help of a modified base-point free pencil trick (to be found in section 1) the authors derive an explicit description of those sheafs L with $\dim |L| = r(s, e)$.

Reviewer: [Ch.Birkenhake \(Erlangen\)](#)

MSC:

14H51 Special divisors on curves (gonality, Brill-Noether theory)

14C21 Pencils, nets, webs in algebraic geometry

14H45 Special algebraic curves and curves of low genus

Keywords:

linear systems; Noether's theorem; plane curve; degree; invertible sheaf