

Explicit presentations of nonspecial line bundles and secant spaces

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A line bundle L on a smooth curve X is nonspecial if and only if L admits a presentation $L=K_X -D +E$ for some effective divisors D and $E>0$ on X with $\gcd(D, E)=0$ and $h^0(X, O_X(D))=1$. In this work, we define a minimal presentation of L which is minimal with respect to the degree of E among the presentations. If $L=K_X -D +E$ with $\deg E>2$ is a minimal, then L is very ample and any q -points of X with $q < \deg E$ are embedded in general position but the points of E are not. We investigate sufficient conditions on divisors D and E for $L=K_X -D +E$ to be minimal. Through this, for a number n in some range, it is possible to construct a nonspecial very ample line bundle $L=K_X -D +E$ on X with/without an n -secant $(n-2)$ -plane of the embedded curve by taking divisors D and E on X . As its applications, we construct nonspecial line bundles which show the sharpness of Green and Lazarsfeld's Conjecture on property (N_p) for general n -gonal curves and simple multiple coverings of smooth plane curves.

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