

1067-14-2271

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Let C be an irreducible projective curve of degree d in $\mathbf{P}^n(\mathbf{K})$, where \mathbf{K} is an algebraically closed field, and let I be the associated homogeneous prime ideal. We wish to compute generators for I , assuming we are given sufficiently many points on the curve C . In particular if I can be generated by polynomials of degree at most s and we are given $sd + 1$ points on C , then we can find a set of generators for I . We will show that a minimal set of generators of I can be constructed in polynomial time.

Our constructions are completely independent of any notion of term ordering and this allows us the maximal freedom in performing our constructions in the most numerically stable way possible.

We also summarize some classical results on bounds for the degrees of generators of our ideal in terms of the degree and genus of the curve. This work is in response to a problem posed to us by Mika Seppala at the AMS meeting in Washington two years ago.

(Received September 22, 2010)