

“Minimal free resolution of hyperelliptic Curves”

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Let X be a hyperelliptic curve of arithmetic genus g and let $f : X \rightarrow \mathbb{P}^1$ be the hyperelliptic involution map of X . In this talk, I will consider higher syzygies of linearly normal embeddings of X of degree $d \geq 2g$. Note that the minimal free resolution of X of degree $\geq 2g + 1$ is already completely known.

Let $A = f^*\mathcal{O}_{\mathbb{P}^1}(1)$, and let \mathcal{L} be a very ample line bundle on X of degree $d \leq 2g$. For $m = \max \{t \in \mathbb{Z} \mid H^0(X, \mathcal{L} \otimes A^{-t}) \neq 0\}$, we call the pair $(m, d - 2m)$ *the factorization type of \mathcal{L}* . I will explain how the graded Betti numbers of the linearly normal curve embedded by $|\mathcal{L}|$ are precisely determined by the factorization type of \mathcal{L} .