

Cohomology of algebraic plane curves

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Let $C \subset \mathbb{P}^2$ be a curve given by $f = 0$ where $f \in S = \mathbb{C}[x, y, z]$. Denote by J_f the Jacobian ideal of f , i.e. the ideal generated by the partial derivatives of f . We describe the relations between the Milnor algebra $M(f) = S/J_f$ of f and the singularities of C which can be done by a study of the cohomology of the Koszul complex of the partial derivatives of f . We also give a description of the Hodge filtration on the cohomology groups $H^*(U)$ of the complement $U = \mathbb{P}^2 \setminus C$ of C .