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4. Algebraic Geometry

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Almost factorial quartic surfaces in $\mathbb{P}^3_{\mathbb{C}}$ with a tacnodal point

Noether, Andreotti, Deligne proved that any algebraic curve on the generic algebraic quartic surface F in $\mathbb{P}^3_{\mathbb{C}}$ is a complete intersection of F with another surface, i. e. $\mathbb{C}[F]$ is factorial.
Our problem is: find the normal quartic surfaces F such that any curve on it is a set-theoretic complete intersection, i. e. $\mathbb{C}[F]$ is almostfactorial. Normal quartic surfaces in $\mathbb{P}^3_{\mathbb{C}}$ with a triple or quadruple point have already been classified. Here we find seven families of almostfactorial quartic surfaces F endowed with an isolated double point of tacnodal type. For each curve C on F a way to compute a surface G such that $F \cap G = C$ is given. For five families it results $I(C, F \cap G) \leq 4$ and $I(C, F \cap G) \leq 12$ for the others.