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Generic C^2 Spline Dimensions via Defect Modules and Deformation

We study planar C^2 spline dimensions through graded defect modules and deformations of vertex coordinates. For an explicit infinite family of triangulations obtained from split bipyramids, we aim to prove that every quartic spline on a generic realization is a global polynomial. We also derive a conditional first-order criterion for eliminating degree-six cofactor generators, illustrated by an exact rational calculation. These results address specific families and deformation mechanisms within the higher-smoothness generalization of Strang's spline dimension problem.