Mathematics > Algebraic Geometry

On the dimension of spline spaces on planar T-subdivisions

Bernard Mourrain (INRIA Sophia Antipolis)

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We analyze the space S_{m, m'}^{r, r'} (T) of bivariate functions that are piecewise polynomial of bidegree (m, m') and class C^{r, r'} over a planar T-subdivision. We give a new formula for the dimension of this space by exploiting homological techniques. We relate this dimension to the number of nodes on the maximal interior segments of the subdivision, give combinatorial lower and upper bounds on the dimension of these spline spaces for general hierarchical T-subdivisions. We show that these bounds are exact, for high enough degrees or if the subdivision is enough regular. Finally, we analyse cases of small degrees and regularities.

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