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Hypersurfaces with many $A_j$-singularities: explicit constructions. (English) Zbl 1291.14055
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Summary: A construction of algebraic surfaces based on two types of simple arrangements of lines, containing the prototiles of substitution tilings, has been proposed recently. The surfaces are derived with the help of polynomials obtained from the lines generating the simple arrangements. One of the arrangements gives the generalizations of the Chebyshev polynomials known as folding polynomials. The other produces a family of polynomials which generates surfaces having more real nodes, and they can also be used, in combination with Belyi polynomials, to derive hypersurfaces in the complex projective space with many $A_j$-singularities. In some cases explicit expressions can be obtained from the classical Jacobi polynomials. The lower bounds for the maximum possible number of $A_j$-singularities in certain hypersurfaces of degree $d$ are improved for several values of $d$ and $j$.

MSC:

14J17  Singularities of surfaces or higher-dimensional varieties
14J70  Hypersurfaces and algebraic geometry

Keywords:
singularities; algebraic surfaces

Software:

AlgebraicSurface; surfex; SINGULAR

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