Mathematics > Algebraic Geometry

Reflexive polytopes of higher index and the number 12

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We introduce reflexive polytopes of index l as a natural generalisation of the notion of a reflexive polytope of index 1. These l-reflexive polytopes also appear as dual pairs. In dimension two we show that they arise from reflexive polygons via a change of the underlying lattice. This allows us to efficiently classify all isomorphism classes of l-reflexive polygons up to index 200. As another application, we show that any reflexive polygon of arbitrary index satisfies the famous "number 12" property. This is a new, infinite class of lattice polygons possessing this property, and extends the previously known sixteen instances. The number 12 property also holds more generally for l-reflexive non-convex or self-intersecting polygonal loops. We conclude by discussing higher-dimensional examples and open questions.

Comments:	Dedicated to the memory of Maximilian Kreuzer. 23 pages, 4 figures, 4 tables, an appendix containing Magma source code
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