

The symmetric moment curve

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Abstract

I plan to discuss various interesting and, to a large extent, mysterious properties of the symmetric moment curve

$$t \longmapsto (\cos t, \sin t, \cos 3t, \sin 3t, \dots, \cos(2k-1)t, \sin(2k-1)t)$$

in \mathbb{R}^{2k} . For $k = 2$, the convex hull of the curve was described by Smilanski, for general k it was used in a joint work with Isabella Novik and Seung Jin Lee to construct $2k$ -dimensional centrally symmetric polytopes with many faces, though long before that it appeared in Nudelman's work as a solution to an isoperimetric problem.