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*Hyperbolic polynomials, interlacers, and sums of squares.*

Hyperbolic polynomials are real polynomials whose real hypersurfaces are nested ovals, the inner most of which is convex. These polynomials appear in many areas of mathematics, including optimization, combinatorics and differential equations. I'll give an introduction to this topic and discuss the special connection between hyperbolic polynomials and their interlacing polynomials (whose real ovals interlace the those of the original). This will let us related inner oval of a hyperbolic hypersurface to the cone of nonnegative polynomials and, sometimes, to sums of squares. An important example will be the basis generating polynomial of a matroid. (Received February 18, 2013)