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Benjamin Braun* (benjamin.braun@uky.edu), **Robert Davis** and **Liam Solus**. *Detecting the Integer Decomposition Property and Ehrhart Unimodality in Reflexive Simplices*. Preliminary report.

The Ehrhart series of a lattice polytope P is a rational function encoding the number of lattice points in nonnegative integer scalings of P . The numerator of this series is the (Ehrhart) h^* -polynomial of P . An active topic of research is to characterize those polytopes for which the distribution of the coefficients of the h^* -polynomial is unimodal. A wide-open conjecture claims that all Gorenstein polytopes with the integer decomposition property (IDP) have unimodal h^* -polynomials. It is worthwhile to investigate the validity of this conjecture in the special case of reflexive simplices. The collection of reflexive simplices admits a classification in terms of arithmetic sequences. In this paper, we use this arithmetic classification to recast the open conjecture in the language of number theory. We first provide a number theoretic characterization of the h^* -polynomials and IDP for a subfamily of reflexive simplices. We develop a systematic framework by which to study this problem and validate the conjecture for families of reflexive simplices. We see there exist simplices within these families that meet only a necessary (but not sufficient) condition for IDP that also have unimodal h^* -polynomials. (Received January 31, 2017)