1131-52-82 **Anthony W Harrison*** (aharri60@kent.edu) and **Jenya Soprunova**. *Computing the lattice size of a lattice polygon.*

Combinatorial and geometric properites of polyhedra are often useful for answering algebraic questions about toric varieties. Determining the lattice size of a polygon is such an instance with applications to toric surfaces and error-correcting codes.

The lattice size of a lattice polygon P, denoted $\mathrm{ls}(P)$, is defined to be the smallest number n such that the image of P under an affine unimodular transformation is contained within the n-dilate of the standard 2-simplex. Castryck, Cools, and Shicho showed that there is a recursive algorithm that computes the lattice size of P by relating $\mathrm{ls}(P)$ to the lattice size of the convex hull of the interior lattice points of P.

We have developed an algorithm that computes the lattice size of P without the computational expense of determining the interior lattice points. We show that if a fixed, finite set of transformations does not yield a "smaller" image of P, then a translate of P already fits in the smallest possible dilate. This allows the determination of the lattice size by using operations that only require the vertices of P.

We also discuss a variant of the lattice size where the unit cube is used in place of the simplex. (Received July 05, 2017)