Alexander Heaton* (aheaton@uwm.edu). Graded multiplicity in harmonic polynomials from the Vinberg setting.

We describe the graded multiplicity of irreducible representations by counting integral points on faces of a polyhedron. This description applies to a family of examples from the following context (first considered by Vinberg): Let $G$ be a connected reductive algebraic group over the complex numbers. A subgroup, $K$, of fixed points of a finite-order automorphism acts on the Lie algebra of $G$. Each eigenspace of the automorphism is a representation of $K$. The harmonic polynomials on an eigenspace are graded by homogeneous degree, giving us a graded representation of $K$. Given any irreducible representation of $K$, we will see how its multiplicity in the harmonic polynomials is distributed among the various graded components. The results are described geometrically by counting integral points on faces of a polyhedron. The multiplicity in each graded component is given by intersecting these faces with an expanding sequence of shells. (Received July 21, 2018)