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**Alexander Heaton\*** ([aheaton@uwm.edu](mailto:aheaton@uwm.edu)), 2865 N Weil St, Milwaukee, WI 53212. *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 September 09, 2018)