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**Graded Multiplicity in Harmonic Polynomials from the Vinberg Setting**

We consider Vinberg $\theta$-groups associated to a cyclic quiver on $r$ nodes. Let $K$ be the product of general linear groups associated to the nodes, acting naturally on $V = \oplus \mathrm{Hom}(V_i, V_{i+1})$. We study the harmonic polynomials on $V$ in the specific case where $\dim V_i = 2$ for all $i$. For each multigraded component of the harmonics, we give an explicit decomposition into irreducible representations of $K$, and additionally describe the multiplicities of each irreducible by counting integral points on certain faces of a polyhedron.

**Keywords**: Harmonic polynomials, theta-groups, Vinberg pair.

**MSC**: 20G05.