1062-17-222 **Apoorva Khare*** (apoorva.khare@yale.edu), Department of Mathematics, Yale University, PO Box 208283, New Haven, CT 06520, and **Vyjayanthi Chari** and **Tim Ridenour**. *Faces of polytopes and Koszul algebras.* Preliminary report.

Given a complex semisimple Lie algebra $\mathfrak{g}$ and a finite-dimensional $\mathfrak{g}$-module V, we study the category $\mathcal{G}$ of finite-dimensional graded $\mathfrak{g} \ltimes V$-modules. Using a larger category, we are able to explicitly write down a projective resolution of each simple object of $\mathcal{G}$, and also compute all Ext's between any two simple modules.

For each face of the polytope spanned by the weights of V, we define a partial order on the set of simple objects in $\mathcal{G}$. For each interval, the corresponding truncated subcategory of $\mathcal{G}$ is equivalent to modules over an algebra that is basic, quasi-hereditary, and Koszul. (Received August 09, 2010)