

Meeting: 1002, Pittsburgh, Pennsylvania, SS 2A, Special Session on Convexity and Combinatorics

1002-52-103 **Carl W. Lee*** (lee@ms.uky.edu), Department of Mathematics, 715 POT, University of Kentucky, Lexington, KY 40506, and **Matt Menzel** and **Laura Schmidt**. *Some Construction Techniques for Convex Polytopes*. Preliminary report.

We will discuss some construction techniques for convex polyhedra, with an eye toward realizing some classes of f-vectors and flag f-vectors.

1. Billera and Lee describe a set of necessary conditions for f-vectors of antistars in simplicial polytopes, and hence for regular triangulations and (by duality) for unbounded, simple polyhedra. It is not yet known whether these conditions are sufficient. In joint work with Laura Schmidt we construct certain classes of regular triangulations to demonstrate the sufficiency of these conditions in low dimensions. The construction exploits some of the combinatorial structure of the simplicial polytopes used in the proof of the g-Theorem.

2. The set of flag f-vectors of four-dimensional polytopes has not yet been characterized. Extending the sewing technique of Shemer (dual to Barnette's facet-splitting), in joint work with Matt Menzel we discuss a generalized sewing method to construct nonsimplicial polytopes. One encouraging feature of this method is that it encompasses the construction of ordinary polytopes by Bisztriczky and Dinh. We present some results on the set of flag f-vectors of four-dimensional polytopes achievable by this process. (Received September 08, 2004)