1062-14-84 **Allen Knutson*** (allenk@math.cornell.edu). *Initial ideals of compatibly Frobenius split ideals.*
Let $f \in \mathbb{F}[x_1, \ldots, x_n]$ be degree n, with initial term $init\ f = \prod_{i=1}^n x_i$ (with respect to some term order). From the hypersurface $\{f = 0\}$, one can construct many other subschemes Y of affine space, by decomposing into irreducible components, intersecting those, and repeating this process.

Theorem.

1. All of these intersections are reduced.

2. If Y is one of (or even a union of) these varieties, then $init\ Y$ is a reduced union of coordinate subspaces.

3. There is a natural decomposition of an $(n-1)$-simplex, with strata indexed by these $\{Y\}$, from which one can recover the poset thereof. If Y's closed stratum is a shellable ball, then Y is Cohen-Macaulay. If Y's open stratum is the interior of that ball, then Y is normal.

4. For any reduced word for a Weyl group element v, there exists such an f for which the Ys encountered are the Kazhdan-Lusztig varieties $X_w \cap X_\circ^v$, and the conditions in part 3 hold. (This recovers the known result that Kazhdan-Lusztig varieties are normal and Cohen-Macaulay.)

The proof uses degenerations of Frobenius splittings. (Received July 27, 2010)