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## A Stratification of the Middle-level MacPhersonian

### Abstract for the Combinatorics Seminar 2005 March 31

The *MacPhersonian*  $\text{MacP}(k,n)$  is the partially ordered set of all oriented matroids of rank  $k$  on the ground set  $\{1, 2, \dots, n\}$ , ordered by  $M_1 \geq M_2$  if there is a weak map from  $M_1$  to  $M_2$ .  $\text{MacP}(k,n)$  can be viewed as a combinatorial analog of the Grassmann manifold  $G(k,n)$  of  $k$ -planes in  $\mathbf{R}^n$ .

The Grassmannian  $G(k,n)$  has a type of cell decomposition called a *Schubert cell decomposition*. To define the cells we need to fix some subspaces of  $\mathbf{R}^n$ . It is known that for a special Schubert cell decomposition of  $G(k,n)$ , we can give an explicit combinatorial definition of cells for a cell decomposition of  $\text{MacP}(k,n)$ . This combinatorial analog of a Schubert cell decomposition of  $G(k,n)$  is called a *Schubert stratification* of  $\text{MacP}(k,n)$ .

In studying spectral structures on  $\text{MacP}(k, \text{infinity})$ , I found that another stratification of  $\text{MacP}(n, 2n)$ , based on a different Schubert cell decomposition of  $G(n, 2n)$ , looks promising. I will show the ideas behind this work in progress.

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