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A Stratification of the Middle-level MacPhersonian

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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 $M_1 \succeq M_2$ 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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