Evan: *Matroids and Greedy Algorithms on Them*

Peer Feedback

- While I appreciated the style of sticking to one board and not meandering too much, I think it would be more instructive if you wrote bigger and used more boards to make up for it.
- The basic examples of graphs and matrices were great. I would love to have seen more examples which are more involved.
- I didn't really buy that the greedy algorithm you described "converges", whatever that means. Maybe a couple comments about that would have been nice.

Three Things

- *Motivation*: Matroids generalize the notion of "independence" to other settings.
- *Definition*: A matroid is a pair (E, I) where E is a set called the "ground set" and $I \subseteq \mathcal{P}(E)$ satisfies
  - $\emptyset \in I$,
  - if $A \in I$ and $B \subseteq A$, then $B \in I$,
  - if $A, B \in I$ and $|A| > |B|$, then there is some $a \in A$ such that $B \cup \{a\} \in I$.
- *Point of Talk*: Given a weighted matroid (matroid with weights), there is a greedy algorithm which gives an independent set of maximum weight and size. Generalizes Kruskal's algorithm for finding spanning forests.

Ethan: *Quasisymmetric Functions*

Peer Feedback

- While the starting motivation was good, I think you introudced too much notation too fast in the beginning. In my opinion, a math talk should have a continuous, slow increase in difficulty throughout the talk, not a sharp jump.
- I find math talks the most engaging when the speaker barely uses their notes and gives their exposition in an impromptu manner. Try to wean off using notes so much.
- Try to stick to the time limit set by the organizers for math talks.

Three Things

- Quasisymmetric functions are an attempt to build a larger ring of generating functions than the symmetric fyunctions by using compositions instead of partitions as our fundamental combinatorial object.
- Analgous to how semistandard Young tableaux are used in the theory of symmetric functions, we have a notion of tableaux for compositions called *semistandard reverse composition tableaux*.
- In this way, quasisymmetric Schur functions can be built, and these in fact can be used to write ordinary Schur functions as a sum of quasisymmetric Schur functions.

Samir: *Symmetry of Grothendieck Polynomials*

Peer Feedback

- It is hard to give any critical feedback to someone who has already nearly mastered the art of giving math talks. Your boardwork and pacing were excellent
- My one critique is to maybe think a bit more deeply about the example you utilized so that you can respond quicker to questions regarding it.
- I would have loved a more in depth discussion of the history of Grothendieck polynomials and how they arose.

Three Things

- Analagous to ordinary tableaux, we have a collection $SVT(\lambda)$ of what are called *set-valued tableaux* corresponding to a partition λ.
- *Definition*: Given $\lambda \vdash d$,
$$G_\lambda = \sum_{T \in SVT(\lambda)} \beta^{|T|-|\lambda|} x^{\omega(T)}.$$
- $G_\lambda = S_\lambda +$ (higher degree terms in β). Symmetry is shown via a generalization of the Bender-Knuth involution.