Chapter 1

Chow Rings and Bergmann Fans

1.1 Chow Rings

TO DO: Introduce the Chow Ring of a matroid. From lattice of flats to quotient ring

TO DO: Use our example matroid and construct its Chow Ring

1.1.1 Properties of Chow Rings

TO DO: Use words like *homogeneous polynomial*, *graded ring*, etc...

1.1.2 The Degree Map

TO DO: How do I explain this? I guess I can at least say it's linear and sends terms of full degree to 1. Maybe I'll understand it this time around

1.2 Bergmann Fans

TO DO: Quick definition of a fan?

1.2.1 How to make a Bergmann Fan

TO DO: Show definition from Chow Ring to Bergmann Fan

TO DO: Work our small example into a fan

1.2.2 Properties of Bergmann Fans

TO DO: Figure out their important properties. They're unimodal, so we'll include that. Oh, they're balanced as well (and so tropical). What am I missing?

TO DO: Define star of a fan. Reference A-H-K; star of a Bergmann fan is again a Bergmann fan? Or something like that

1.3 Relationship with the Characteristic Polynomial

TO DO: Come up with a nice way of relating the reduced characteristic polynomial with our ring (and therefore fan)

TO DO: Define α and β. Here or in a subsection? Or should it be up when we introduce the ring itself?

1.3.1 How to show Log-Concavity

TO DO: Offer a self-contained proof that log-concavity is equivalent to showing that one particular relationship between α and β found in A-H-K. They have the proof, but it requires digging through citations. Should be able to consolidate it.