The Wonderful Geometry of Matroids

Lecture 7: The Möbius function

In this lecture we defined the incidence algebra and the Möbius function of a poset. We used the Möbius function and the Möbius ring to prove a nice formula for the value of the Möbius function on the maximal interval of the lattice of flats of a matroid. We also used a similar argument to prove Weisner’s Theorem.

1. Draw the lattice of flats of $M(K_4)$ and compute $\mu(\emptyset, F)$ for each flat $F$.

Hint: There are two reasonable ways to do this: by hand, or using the corollary from class. Try both!