Assignment 3
due on Tuesday, November 14, 2017

Name:

As in the lecture, to each obstruction design $\mathcal{H}_n$ we have the corresponding highest weight vector function $f_{\mathcal{H}_n}$.
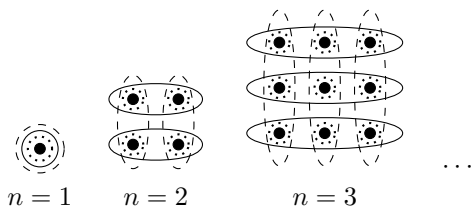
Exercise 1 (10 points).
Consider two obstruction designs $\mathcal{H}_1$ and $\mathcal{H}_2$. Take their union (the usual union of hypergraphs by just drawing them next to each other) and call the resulting obstruction design $\mathcal{H}_3$. Prove that

$$f_{\mathcal{H}_3} = f_{\mathcal{H}_1} \cdot f_{\mathcal{H}_2}$$

as functions.

Exercise 2 (15 points).
Consider the following sequence of obstruction designs $\mathcal{H}_n$.

$$n = 1 \qquad n = 2 \qquad n = 3$$

Prove that $f_{\mathcal{H}_n}$ is the zero function if $n > 1$ is odd.

Exercise 3 (15 points).
For odd n, find an obstruction design $\mathcal{H}'_n$ of the same type as $\mathcal{H}_n$ in the previous exercise, but with $f_{\mathcal{H}'_n} \neq 0$.