
Topics in Combinatorics

Assignment 3

Due Date: 09/03/2018

Given below is a list of rational arrangements. For each arrangement find the characteristic polynomial using the finite field method.

1. For $1 \leq k \leq n$ the arrangement $\mathcal{S}_{n,k}$ contains following hyperplanes:

$$x_i - x_j = 0 \text{ for } 1 \leq i < j \leq n,$$

$$x_i - x_j = 1 \text{ for } 1 \leq i < j \leq k.$$

2. For $1 \leq k \leq n$ the arrangement $\mathcal{G}_{n,k}$ contains following hyperplanes:

$$x_i = 0 \text{ for } 1 \leq i < j \leq n,$$

$$x_i \pm x_j = 0 \text{ for } 1 \leq i < j \leq n,$$

$$x_i + x_j = 1 \text{ for } 1 \leq i < j \leq k.$$

3. The arrangement \mathcal{TC}_n given by

$$\{x_i = 0 \mid 1 \leq i \leq n\} \cup \{x_i - x_j = 0 \mid i < j\} \cup \{x_i = 2x_j \mid 1 \leq i \neq j \leq n\}.$$

4. The arrangement \mathcal{T}_n given by

$$\{x_i - x_j = 0 \mid i < j\} \cup \{x_i = 2x_j \mid 1 \leq i \neq j \leq n\}.$$