1135-05-2544 **Joungmin Song*** (songj@gist.ac.kr), Gwangju Institute of Science and Technology, Cheomdan Gwagiro 123, GIST College Bldg A-410, Gwangju, 61005, South Korea. *Characteristic polynomial of hyperplane arrangements via enumerative combinatorics and finite field method.*

A hyperplane arrangement is a finite set of affine hyperplanes in a real affine space. Let $\mathcal{J}_n$ be the hyperplane arrangement consisting of all hyperplanes (or walls) $H_{ij},\ 0_k, 1_l$, where, for each i, j, k, and $l \in \{1, 2, \ldots, n\}$,

$$H_{ij} := \{\mathbf{x} \in \mathbb{R}^n \mid x_i + x_j = 1\} = H_{ji}$$

and

$$0_k := \{\mathbf{x} \in \mathbb{R}^n \mid x_k = 0\},\ \text{and}\ 1_l := \{\mathbf{x} \in \mathbb{R}^n \mid x_l = 1\}.$$

The number of the *regions*, i.e., the connected components of $\mathbb{R}^n \setminus \bigcup_{H\in\mathcal{J}_n} H$ is given by the characteristic polynomial $\chi_n(t)$. We formulate $\chi_n(t)$ via enumerative combinatorics and finite field method. We give a direction forward generalizing this process to $\mathcal{H}_n$, whose walls are of the form

$$w_S = \left\{ \mathbf{x} \in \mathbb{R}^n \,\middle|\, \sum_{i\in S} x_i = 1 \right\}.$$

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