

# Investigating Terao's freeness conjecture with computer algebra

*Thursday, 10 March 2022 09:15 (1 hour)*

Motivated by singularity theory, Hiroaki Terao introduced a module of logarithmic derivations associated with a hyperplane arrangement. This talk is concerned with Terao's freeness conjecture which asserts that the freeness of this derivation module is determined by the underlying combinatorics of the arrangement.

To investigate this conjecture, we have enumerated all matroids of rank 3 with up to 14 hyperplanes whose characteristic polynomial splits over the integers and saved it in a public database. Subsequently we have computed the moduli space and the free locus of the derivation module of each of these matroids as a quasi-affine set. As the main result, this yields a computational proof of Terao's freeness conjecture for rank 3 arrangements with up to 14 hyperplanes over arbitrary characteristic.

In this talk, I will explain the background of this conjecture without assuming prior knowledge and demonstrate the database and highlights of the computations.

This talk is based on joint work with Mohamed Barakat, Reimer Behrends, Christopher Jefferson, and Martin Lerner.

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**Session Classification:** Hauptvorträge