Abe, Takuro

The b_2 -inequality and freeness of the restrictions of hyperplane arrangements

The b_2 -inequality was introduced to show the division theorem for free arrangements. This becomes the equality if there is a division of characteristic polynomials of the original and restricted arrangements. We investigate how the equality controls the algebraic structure of logarithmic vector fields of them, and apply it to a new formulation of Terao's deletion theorem.

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