Intersections of Amoebas

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Abstract

Amoebas are projections of complex algebraic varieties in the algebraic torus under a Log-absolute value map, which have connections to various mathematical subjects. While amoebas of hypersurfaces have been inten- sively studied during the last years, the non-hypersurface case is barely understood so far. We investigate intersections of amoebas of n hypersurfaces in $(\mathbb{C}\star)n$, which are genuine supersets of amoebas given by non-hypersurface vari- eties. Our main results are amoeba analogs of Bernstein's Theorem and Be zout's Theorem providing an upper bound for the number of connected components of such intersections. Moreover, we show that the order map for hypersur- face amoebas can be generalized in a natural way to intersections of amoebas. We show that, analogous to the case of amoebas of hypersurfaces, the restriction of this generalized order map to a single connected component is still 1-to-1.

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