1047-14-77 **Mounir Nisse*** (`nisse@math.jussieu.fr`), Université Pierre et Marie Curie-Paris 6, IMJ, Labo: Analyse Algébrique, Office: 7C14, 175, rue du Chevaleret, 75013, Paris, France, Paris, France.

Amoebas and coamoebas, relationships and similarities.

Let V be an algebraic hypersurface in $(\mathbb{C}^*)^n$. We show that the complement components of the coamoeba of V in the flat torus $(S^1)^n$ have a similar properties as the complement components of the amoeba of V in $\mathbb{R}^n$. More precisely, if $co\mathcal{A}_V$ is the coamoeba of V, then we prove that the connected components of $(S^1)^n \setminus \overline{co\mathcal{A}_V}$ are convex and their number cannot exceed $n!\mathrm{Vol}(\Delta)$, where Δ is the Newton polytope of the polynomial defining V, and $\overline{co\mathcal{A}_V}$ is the closure of $co\mathcal{A}_V$ in the real torus $(S^1)^n$. In addition, we prove that the area of the coamoeba of a complex algebraic plane curve counted with multiplicity cannot exceed $2\pi^2\mathrm{Area}(\Delta)$, and the equality hold if and only if the curve is a Harnack, possibly with ordinary real isolated double points. In the same way, we show that a polynomial f defining a Harnack curve is dense i.e., its support is $\Delta\cap\mathbb{Z}^2$. Using a geometric properties of the coamoebas and the logarithmic Gauss map, we give a second proof of Passare-Rullgård's conjecture, that the amoeba of a complex algebraic hypersurface defined by a maximally sparse polynomial is solid. (Received January 15, 2009)