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Relation between Onofri and Caffarelli–Kohn–Nirenberg inequalities

I will first discuss a class of inequalities of Onofri type depending on a parameter, in the two-dimensional Euclidean space.

Then I will explain how these inequalities give us some insight on the symmetry breaking phenomenon for the extremal functions of the Caffarelli–Kohn–Nirenberg inequality, in two space dimensions. In fact, for suitable sets of parameters (asymptotically sharp) we prove symmetry or symmetry breaking by means of a blow-up method and a careful analysis of the convergence to a solution of a Liouville equation. In this way, the Onofri inequality appears as a limit case of the Caffarelli–Kohn–Nirenberg inequality.

This is joint work with J. Dolbeault and G. Tarantello