

Joan C. Artés Universitat Autònoma de Barcelona, Catalonia

TITLE Topological invariants applied to the classification of phase portraits of quadratic differential systems. The birth of an Encyclopedia on quadratic systems.

Abstract: Along the years, there have appeared many classifications of phase portraits of quadratic differential systems. Some having some few portraits and others with several hundreds. At this moment, it is not yet known the number of topologically distinct phase portraits of quadratic systems, not even modulo limit cycles. Even more, it is not always trivial to realize if two phase portraits are topologically distinct or not, specially when one needs to compare many phase portraits, even within one same paper. And often, an author (even myself) has assured that all the phase portraits he presents are topologically distinct, and they are not.

In this talk we will present some topological invariants which work to describe every phase portrait of a quadratic differential system, and which serves to compare in a systematic way all the phase portraits of a paper, and also to compare phase portraits of different papers. This method has been applied to a set of 80 papers containing altogether more than 4500 phase portraits and allows to detect easily all the papers in which a same phase portrait has appeared. Moreover it serves to detect wrong phase portraits and missed ones. And this is also very useful for any new classification since it may easily detect if some phase portrait is missing in it, or if it brings up a still unknown phase portrait.”