

PROBABILITY OF EXISTENCE OF LIMIT CYCLES FOR A FAMILY OF PLANAR SYSTEMS

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ABSTRACT. The goal of this work is the study of the probability of occurrence of limit cycles for a family of planar differential systems that are a natural extension of linear ones. To prove our results we first develop several results of non-existence, existence, uniqueness and non-uniqueness of limit cycles for this family. They are obtained by studying some Abelian integrals, via degenerate Adronov-Hopf bifurcations or by using the Bendixson-Dulac criterion. To the best of our knowledge, this is the first time that the probability of existence of limit cycles for a non-trivial family of planar systems is obtained analytically. In particular, we give vector fields for which the probability of having limit cycles is positive, but as small as desired. This work is in collaboration with B. Coll[†] and A. Gasull[‡].

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