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ON A CLASS OF GLOBAL CENTERS OF LINEAR SYSTEMS WITH QUINTIC HOMOGENEOUS NONLINEARITIES

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Abstract. One of the classical and difficult problems in the qualitative theory of differential systems in the plane is the characterization of their centers. In this paper we characterize the linear and nilpotent global centers of polynomial differential systems with quintic homogeneous terms, with the symmetry $(x, y, t) \to (-x, y, -t)$ and without infinite singular points.

Keywords. center, global center, quintic polynomial differential system

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1 Introduction and statement of the main results

When all the orbits of a planar differential system in a punctured neighborhood of a singular point p are periodic we say that p is a *center*. If the orbits of a planar differential system in a punctured neighborhood of p spiral to p when $t \to \pm\infty$ then p is a *focus*. If the origin is either a focus or a center we say that it is a *monodromic singular point*. The clasical center-focus problem started with Poincar [8] and Dulac [3] and in the present day many questions remain open about this problem.

It is known that if a real planar analytic system has a center, then after an affine change of variables and a change of scale of the time variable, it can