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The period function of reversible quadratic centers $\stackrel{\text{there}}{\Rightarrow}$

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Abstract

In this paper we investigate the bifurcation diagram of the period function associated to a family of reversible quadratic centers, namely the dehomogenized Loud's systems. The local bifurcation diagram of the period function at the center is fully understood using the results of Chicone and Jacobs [Bifurcation of critical periods for plane vector fields, Trans. Amer. Math. Soc. 312 (1989) 433–486]. Most of the present paper deals with the local bifurcation diagram at the polycycle that bounds the period annulus of the center. The techniques that we use here are different from the ones in [C. Chicone, M. Jacobs, Bifurcation of critical periods for plane vector fields, Trans. Amer. Math. Soc. 312 (1989) 433–486] because, while the period function extends analytically at the center, it has no smooth extension to the polycycle. At best one can hope that it has some asymptotic expansion. Another major difficulty is that the asymptotic development has to be uniform with respect to the parameters, in order to prove that a parameter is not a bifurcation value. We study also the bifurcations in the interior of the period annulus and we show that there exist three germs of curves in the parameter

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