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ISOCHRONOUS CENTERS OF REAL PLANAR POLYNOMIAL QUADRATIC-LIKE HAMILTONIAN SYSTEMS

We characterize isochronous centers of real planar polynomial quadratic-like Hamiltonian systems, namely planar differential systems of the form $\dot{x} = -H_y(x, y)$, $\dot{y} = H_x(x, y)$ where $H(x, y) = A(x) + B(x)y + C(x)y^2$ with $A(x), B(x), C(x) \in \mathbb{R}[x]$. Given a polynomial quadratic-like Hamiltonian system with a center at the origin we can determine whether it is isochronous or not. Reciprocally, we can construct most of the polynomial quadratic-like Hamiltonian systems with an isochronous center, modulus the determination of a particular Belyi function. Our results show the strong algebraic properties that are forced by the isochronicity of the center.

This is a joint work with Colin Christopher (University of Plymouth, United Kingdom) and Jordi Villadelprat (Universitat Autònoma de Barcelona).