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Uniqueness and hyperbolicity of limit cycles for autonomous planar systems with zero diagonal coefficient

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Abstract: This paper investigates the uniqueness and hyperbolicity of the autonomous planar system with zero diagonal coefficient $\dot{x} = p_2(y)q_2(x)y$, $\dot{y} = p_3(y)q_3(x)x + p_4(y)q_4(x)y$ and the generalized Liénard system $\dot{x} = \phi(z - F(x))$, $\dot{z} = -g(x)$. Some sufficient conditions that guarantee the uniqueness and hyperbolicity of limit cycles are established. The results of this paper generalize some previous results on this field.

Key words: Autonomous planar systems; Limit cycle; Uniqueness; Hyperbolicity; Exponential asymptoticity.

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