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An Extension of Barbashin–Krasovskii–LaSalle Theorem to a Class of Nonautonomous Systems

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Abstract: In this paper we give an extension of the Barbashin-Krasovskii-LaSalle theorem to a class of time-varying dynamical systems, namely the class of systems for which the restricted vector field to the zero-set of the time derivative of the Liapunov function is time invariant and this set includes some trajectories. Our goal is to improve the sufficient conditions for the case of uniform asymptotic stability of the equilibrium. We obtain an extension of a well-known result of linear zero-state detectability to nonlinear systems, as well as a robust stabilizability result of nonlinear affine control systems.

Keywords: *Invariance Principle; Liapunov functions; detectability; robust stabilizability.*

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