Strict Stability of Fuzzy Differential Equations by Lyapunov Functions

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Abstract : In this study, we have investigated the strict stability of fuzzy differential systems and we compare the classical notion of strict stability criteria of ordinary differential equations and the notion of strict stability of fuzzy differential systems. In addition that, we present definitions of stability and strict stability of fuzzy differential equations and also we have some theorems and comparison results. Strict Stability is a different stability definition and this stability type can give us an information about the rate of decay of the solutions. Lyapunov’s second method is a standard technique used in the study of the qualitative behavior of fuzzy differential systems along with a comparison result that allows the prediction of behavior of a fuzzy differential system when the behavior of the null solution of a fuzzy comparison system is known. This method is a usefull for investigating strict stability of fuzzy systems. First of all, we present definitions and necessary background material. Secondly, we discuss and compare the differences between the classical notion of stability and the recent notion of strict stability. And then, we have a comparison result in which the stability properties of the null solution of the comparison system imply the corresponding stability properties of the fuzzy differential system. Consequently, we give the strict stability results and a comparison theorem. We have used Lyapunov second method and we have proved a comparison result with scalar differential equations.
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