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STABILITY AND ASYMPTOTIC STABILITY IN TERMS OF TWO MEASURES WITH INITIAL TIME DIFFERENCE

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Abstract. We have investigated the stability criteria of dynamic system by using several Lyapunov functions with initial time difference and applied the several Lyapunov functions to a obtain stability and asymptotic stability in terms of two measures by using two or more Lyapunov-like functions with initial time difference.

Keywords. Initial time difference, Lyapunov's direct methods, several Lyapunov functions, stability and asymptotically stability, two measures stability.

AMS (MOS) subject classification: 34D10, 34D99, 34C11.

1 Introduction

The concept of a Lyapunov function and Lyapunov's second method $[1-10]$ has been employed with great success in a wide variety of investigations to understand qualitative and qualitative properties of dynamic systems for many years. In this paper, we have applied the several Lyapunov functions with initial time difference $[4-5, 7-10]$ to a obtain stability and asymptotic stability in terms of several Lyapunov functions by using two or more Lyapunov-like functions [2] with initial time difference. We give the stability and asymptotic stability for a perturbed differential system with respect to an unperturbed differential system. Hence, we have obtained the stability and asymptotically stability for the general set up of two measures and nonautonomous system with initial time difference.

2 Preliminaries

Consider the differential systems (1), (2) and their perturbed systems (3), (4) as follows