

LIPSCHITZ STABILITY OF NONLINEAR SYSTEMS OF IMPULSIVE DIFFERENTIAL EQUATIONS II. LIAPUNOV FUNCTIONS

AMANPREET KAUR AND S. K. SRIVASTAVA

Abstract

The concept of lipschitz stability for certain nonlinearly perturbed non-linear system has been studied in [D & E] (Dannan and Elaydi (1986)) Such systems include certain integro-differential and functional differential equations. This notion of lipschitz stability for differential equations lies somewhere between uniform stability on one side and notion of asymptotic stability in variation [3] and uniform stability in variation [4] on the other side. However, Lipschitz stability is new only as nonlinear phenomenon, since it coincides with uniform stability in linear systems [5]. An important feature of Lipschitz stability is that, unlike uniform stability, the linearized system inherits the property of Lipschitz stability from the original non-linear system [5]. In the present paper the notion of Lipschitz stability for impulsive systems of differential equations has been studied. We give sufficient conditions for the Lipschitz stability of certain nonlinearly perturbed nonlinear systems. Such systems include, among other equations, certain impulsive integro differential and functional differential equations.

Key Words: Impulsive differential equations, Lipschitz stability, Liapunov function, Uniform Lipschitz stability, Impulsive perturbed system.

2000 Mathematics Subject Classification : Primary 47H10, Secondary 54H25.