Nonlinear Dynamics and Systems Theory, **11** (2) (2011) 165–172

Existence of Almost Automorphic Solutions of Neutral Functional Differential Equation

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Received: April 16, 2010; Revised: March 30, 2011

Abstract: In this work we use the theory of evolution semigroup of bounded linear operators and fixed point theorem to establish the existence and uniqueness of a mild solution of a neutral functional differential equation in a Banach space.

Keywords: *almost automorphic function; evolution semigroup; neutral functional differential equation; mild solution.*

Mathematics Subject Classification (2000): 37L05, 34K06, 34A12.

1 Introduction

In 1964, S. Bochner introduced almost automorphic functions in one of his landmark paper [10]. Almost automorphic functions are more general than almost periodic functions. Many authors had established the almost periodic solution of differential equations in abstract spaces ([8, 9, 13, 15], etc.). The theory has been generalized by many authors for almost automorphic solutions ([11, 12, 14], etc.). Goldstein [14] has considered the following differential equation in a Banach space X

$$\frac{dx(t)}{dt} = Ax(t) + f(t, x(t)), \quad t \in \mathbb{R}, \tag{1}$$

where A generates an exponentially stable C_0- semigroup and f be a jointly continuous function and shown the existence of almost automorphic solution of the problem if f is almost automorphic.

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