ANTI-PERIODIC PROBLEM
FOR SEMILINEAR DIFFERENTIAL INCLUSIONS
INVOLVING HILLE–YOSIDA OPERATORS

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ABSTRACT. In this paper we are interested in the anti-periodic problem governed by a class of semilinear differential inclusions with linear parts generating integrated semigroups. By adopting the Lyapunov–Perron method and the fixed point argument for multivalued maps, we prove the existence of anti-periodic solutions. Furthermore, we study the long-time behavior of mild solutions in connection with anti-periodic solutions. Consequently, as the nonlinearity is of single-valued, we obtain the exponential stability of anti-periodic solutions. An application of theoretical results to a class of partial differential equations will be given.

1. Introduction

Differential inclusions play an important role in characterizing many processes and phenomena in reality. In the literature, differential inclusions arise from the description of processes in control theory, differential equations with discontinuous right hand sides or some classes of differential variational inequalities (see, e.g. [1], [2], [7], [17]). Differential inclusions in Euclidean spaces and general Banach spaces have been studied extensively, see the excellent monographs [7], [22] and the references cited therein. In the recent years, there has