

NONLINEAR DIFFERENTIAL INCLUSIONS IN BANACH SPACE WITH NONLOCAL INITIAL CONDITIONS

T. DONCHEV

Let X be a separable Banach space and let $I = [t_0, T] \subset \mathbb{R}_+$.

In this talk we study the following evolution inclusion

$$(1) \quad \begin{cases} \dot{x} \in Ax + F(t, x(t)), & t \in I \\ x(t_0) = x_0 \in \overline{D(A)}, \end{cases}$$

where $A : D(A) \rightrightarrows X$ is an m -dissipative operator and $F : I \times X \rightrightarrows X$ is a multifunction.

First, we study a class of a multivalued perturbations of m -dissipative evolution inclusions with nonlocal initial condition in arbitrary Banach spaces. We prove the existence of solutions when the multivalued right hand side is Lipschitz and admits nonempty closed bounded but, in general case, neither convex nor compact values.

Afterwards a class of nonlocal initial problems of evolution inclusions in the form of compact valued perturbations of m -dissipative evolution inclusions in Banach spaces with uniformly convex duals is considered. The multivalued part is assumed to be one sided Perron.

Finally we prove the existence of solutions to evolution inclusions given by one-sided Lipschitz perturbations of m -dissipative operators with nonlocal initial conditions. The commonly used Lipschitz condition is weakened to one sided Lipschitz one. It allows us to study also multi-point problems with periodic or anti-periodic conditions.

We give examples to illustrate the applicability of our results.

Our approach enable us to use compactness method technique under non compact types assumptions

DEPARTMENT OF MATHEMATICS, UNIVERSITY OF ARCHITECTURE AND CIVIL ENGINEERING, SOFIA 1046, BULGARIA

E-mail address, T. Donchev: tzankodd@gmail.com