Andres, Jan; **Gabor, Grzegorz**; **Górniewicz, Lech**
Boundary value problems on infinite intervals. (English) ‹Zbl 0936.34023›
Trans. Am. Math. Soc. 351, No. 12, 4861-4903 (1999).

The authors develop two methods, both based on topological ideas, to the solvability of boundary value problems for differential equations and inclusions on infinite intervals.

After historical remarks in Section 1, asymptotic boundary value problems as fixed point problems in Fréchet spaces are considered in Section 2. The authors construct a generalized topological degree for set-valued mappings defined on subsets of Fréchet spaces and a fixed point index on retracts of Fréchet spaces. Using this they generalize and extend some existence statements due to the Florence group of mathematicians. For example the convexity restrictions in the Schauder linearization device can be avoided. Four examples complete Section 2.

In Section 3, the existence of bounded solutions to partially dissipative differential inclusions are proved on the positive half-line. Following the ideas of Andres, Górniewicz and Lewicka, who have considered periodic problems, the authors use a sequential approach which consists in investigating the limit process for the family of boundary value problems on infinitely increasing compact intervals. Three examples are given, here.

In Section 4, the structure of solution sets for the Cauchy problem is investigated both for differential inclusions with u.s.c. and l.s.c. right-hand sides.

Sections 5 and 6 consist of some remarks on implicit differential equations on noncompact intervals and of open problems. A large list of references can be find at the end of the paper.

Reviewer: I.Rachůnková (Olomouc)

MSC:

34B40	Boundary value problems on infinite intervals for ordinary differential equations
34A60	Ordinary differential inclusions
34B15	Nonlinear boundary value problems for ordinary differential equations
34G25	Evolution inclusions
47H04	Set-valued operators
54C60	Set-valued maps in general topology

Cited in **4** Reviews
Cited in **33** Documents

Keywords:

asymptotic boundary value problems; differential equations and inclusions; topological methods; Fréchet spaces

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