

## Differential inclusions with unbounded right-hand side and optimization problems

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**Abstract:** The report summarizes the properties of solutions of non-autonomous differential inclusions with unbounded right-hand side. We consider the differential inclusion, the right-hand side of which satisfies the condition, which we call "measurable-pseudo-Lipschitz". This condition generalizes the well-known "integrable sub-Lipschitz condition in the large", introduced by Ph. D.Loewen and P.T. Rockafellar in 1994, as well as "the global pseudo-Lipschitz condition", introduced by A.D. Ioffe in 2006. We prove theorems on the existence of solutions of the differential inclusion, the continuous dependence on the initial data and the differentiability of the solution set of the initial data.

The report also provides a direct method for investigating optimization problems with unbounded differential inclusions in Banach spaces (see [1]). The method consists in the fact that any differential inclusion in a neighborhood of the test trajectory can be approached by a simpler differential inclusion, which graph of the right-hand side is a closed convex cone, which is measurably time-dependent. In contrast to other approximation research methods for such non-smooth optimization problems, the given direct method allows to obtain the necessary conditions with more precise conjugate (polar) cones.

## References

- [1] 1. Polovinkin, E.S., Set-valued analysis and differential inclusions. Moscow: Fizmatlit. - 2014.- 524 P. (in Russian).