

# Cauchy-Kowalevski's theorem applied for counting geometric structures

Barbara Opozda

*Jagiellonian University, Krakow, POLAND*  
[barbara.opozda@im.uj.edu.pl]

The study is inspired by the recent paper of Z. Dusek and O.Kowalski [1]. Roughly speaking the question is how many structures of a prescribed type there exist. By a satisfactory answer we mean a theorem saying that the set of such structures is parametrized by some family (finite) of arbitrarily chosen functions. A local version of the question is considered. It turns out that the theorem of Cauchy-Kowalevski can be used in answering it. Of course, using this tool implies that we must restrict to analytic structures. But the advantage is that the tool belongs to the fundamentals of mathematics and the procedure of getting structures is explicit modulo solving a Cauchy-Kowalevski system of differential equations. On the other hand, it seems that the method fits only very special situations.

- [1] Dusek Z, Kowalski O. How many are Ricci flat affine connections with arbitrary torsion? preprint 2015
  - [2] Mikulski W, Opozda B. Cauchy-Kowalevski's theorem applied for counting geometric structures. arXiv: 1605.06248
-