
JEAN-PIERRE MAGNOT, lycée Jeanne d'Arc

Differential geometry and well-posedness of the KP hierarchy

We describe how the notion of diffeology can apply to Mulase constructions in the KP hierarchy. The existence and the uniqueness of the solution is here re-interpreted with rigorous differential geometric constructions, by two different approaches. The first one is based on the algebraic approach of Reyman and Semenov-tian-Shansky, and the second one describes the solutions of the initial KP hierarchy as the infinite jet of a global section of a principal bundle. These two approaches show very naturally that the solutions depend smoothly of the initials. We finish with three perspectives: the relationship between the KP hierarchy and the KP-I equation, the possibility to consider equations involving non smooth functions, and the extension of the second method to other Lax-type equations.