# Some ideas on resolving causal paradoxes of time travel (abstract)

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Time travel is an interesting topic and we agree with its extensive scientific literature, see, e.g., [1-5], on that the subject worth not being exiled to the realm of mere science fiction. As it is heavily debated whether it is consistent with our actual scientific theories or not and under what conditions is it possible at all, we believe it is useful to pursue deeper understanding. The first part of the talk is going to cover the two kinds of temporal paradoxes: causal loops and consistency paradoxes (e.g., the Grandfather paradox). Both of them are problematic from the point of view of causality. Focus will be on the latter by investigating hopeful ideas of handling them such as using branching spaces times or developing a general method to find a self-consistent model for every possible initial data.

In the course of seeking for a better understanding of time traveling scenarios a new framework has been elaborated which makes possible to “handle paradoxes in the object level” and measure distance between setups. These tools allow to search for self-consistent solutions by an iterative way which is basically a fix point problem. In the talk this framework will be presented and a local counterexample showing that the technique is not working in general. Some ideas to fix the method will also be shown.

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[2] A. Lossev, I. D. Novikov: The Jinn of the time machine: non-trivial self-consistent solutionsClass, Quantum Grav. 9 (1992)

[3] M.B. Mensky, I.D. Novikov: Three-Dimensional Billiards with Time Machine, Intern. J. Mod. Phys. D5 (1996)

[4] J. Dolanský, P. Krtouš: Billiard ball in the space with a time machine, PHYSICAL REVIEW D 82 (2010)

[5] J. Dolanský: The boundary condition of Billiard time machine, Ph.D. Thesis at Charles University in Prague (2011)