

Iberian Strings 2023



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Differential Equations for Cosmological Correlators

Friday 13 January 2023 09:00 (1 hour)

I will review the “bootstrap” approach to compute primordial correlation functions in cosmology (which control the initial conditions for structure formation in the universe). This bootstrap relies on the existence of differential equations in terms of boundary momenta. I will describe a new method to efficiently characterize and (in some sense) explain the existence of these differential equations. The method is general—in fact, it is heavily inspired by technology used in loop computations in flat space—, but I will focus on cosmological correlation functions of a light scalar in power law FLRW cosmologies. It recasts the differential equation in terms of a new (somewhat magical) object, a flat connection in the boundary kinematic space. The mathematical theory of this flat connection is beautiful on its own right, and not fully developed yet. The physical information it carries—in particular, locality of the correlator—is encoded in its structure in a way that I don’t fully understand.

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Session Classification: Invited Contribution