On the cosmological constant appearing as an initial condition for nonhomogeneous inflationary models

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Milne-like spacetimes are a class of k = -1 inflationary FLRW spacetimes which admit continuous extensions through the big bang. Under suitable assumptions on the scale factor, the cosmological constant appears as an initial condition for Milne-like spacetimes. More precisely, the energy density and pressure approach the equation of state of a cosmological constant for points approaching the big bang. However, Milne-like spacetimes can only approximate our universe since our universe is not perfectly isotropic or homogeneous. In this talk, we show that the initial equation of state for nonhomogeneous versions of Milne-like spacetimes is still that of a cosmological constant. That is, the cosmological constant appears as an initial condition even in the nonhomogeneous setting. Some open problems are discussed along with applications to inflationary theory in the nonhomogeneous setting. Moreover, these results have analogues in the k = 0 FLRW setting with eternal inflation; this is joint work with Ghazal Geshnizjani and Jerome Quintin.