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A dynamical systems formulation for inhomogeneous LRS-II spacetimes

I will introduce a dynamical system formulation for inhomogeneous LRS-II spacetimes using the covariant $1+1+2$ decomposition approach, that we recently proposed in 2404.01161. Our approach describes the LRS-II dynamics from the point of view of a comoving observer. Promoting the covariant radial derivatives of the covariant dynamical quantities to new dynamical variables and utilizing the commutation relation between the covariant temporal and radial derivatives, we have been able to show that it is possible to construct an autonomous system of first-order ordinary differential equations along with some purely algebraic constraints. I will talk about some interesting features in the LRS-II phase space with dust, one of them being that the homogeneous solutions constitute an invariant submanifold. For the particular case of LTB, I show that it is possible to recover some previously known results. The talk will be based on our recent work 2404.01161

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