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Representations of New Phase Space and their Evolution in Different Inflationary Era

We have proposed a new phase space coordinate system for scalar field theory that can provide a detailed analysis of the cosmological evolutionary phases in a more generalized manner. We have studied \textcolor{red}{(how many)} intermediate states of cosmic inflations. We have discussed fixed point analysis for these phases. The new phase space dynamics discussed here provide a new family of curves to discuss the cosmic phases as well as cosmic dynamics. We have analysed dynamical trajectories for our expanding universe model. This trajectories can help us to study the dynamics of entire universe phases. Finally, the Equation of state parameter (scalar field) and second law of thermodynamics with entropy based energy conditions have been discussed with these phase space coordinates.

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