General Relativity and Quantum Cosmology

Equation of state and singularities in FLRW cosmological models

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We consider FLRW cosmological models with standard Friedmann equations, but leaving free the equation of state. We assume that the dark energy content of the universe is encoded in an equation of state $p=f(\rho)$, which is expressed with most generality in the form of a power expansion. The inclusion of this expansion in Friedmann equations allows us to construct a perturbative solution and to relate the coefficients of the equation of state with the formation of singularities of different types.

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