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Alleviating the H_0 and σ_8 tensions via general conformal coupling between dark energy and dark matter

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The purpose of this research is to study cosmological effects of the coupling between dark energy and dark matter through the general conformal transformations in which the coefficient of conformal depends on both scalar field and its kinetic term. Using dynamical analysis, the influence of general conformal coupling on the evolution of background universe is investigated. We found that the evolution of background universe has scaling fixed point corresponds to acceleration of the universe at late time. For suitable choices of parameters, the universe can evolve from radiation dominated epoch to ϕ -matter dominated epoch and reaching to scaling fixed point at late time. The effective equation of state during ϕ -matter dominated epoch is slightly positive. Therefore, the H_0 tension can be alleviated. Also, the effective gravitational coupling for dark matter perturbations in this model can be smaller than in Λ CDM model. Then, the growth rate of dark matter perturbations is less than in Λ CDM model. Thus, the σ_8 tension can be alleviated.

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