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Disformal coupling between dark energy and dark matter and the dynamics of the universe

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We consider a cosmological model where the coupling between dark energy and dark matter is motivated by disformal transformation. We consider the case where conformal coefficient depends only on scalar field while disformal coefficient depends both on the scalar field and its kinetic energy. We found that there exist new two classes of fixed point when disformal coefficient depend on both scalar field and kinetic. These two classes of the fixed point can describe accelerated expansion of the universe at late time. The first class of the fixed points can exists only when the disformal coefficient depends on the kinetic of scalar field. The fixed point in the second class are able to be stable fixed point within the parameters ranges that correspond to the accelerated expansion of the universe. These fixed point can take two different values of the fixed point for the same values of the parameters of the model.

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