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Duality between static spherically or hyperbolically symmetric solutions and cosmological solutions in scalar-tensor gravity

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We study static spherically and hyperbolically symmetric solutions of the Einstein equations in the presence of a conformally coupled scalar field and compare them with those in the space filled with a minimally coupled scalar field. We then study the Kantowski-Sachs cosmological solutions, which are connected with the static solutions by the duality relations. The main ingredient of these relations is an exchange of roles between the radial and the temporal coordinates, combined with the exchange between the spherical and hyperbolical two-dimensional geometries. A brief discussion of questions such as the relation between the Jordan and the Einstein frames and the description of the singularity crossing is also presented.

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