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Self-Similar Solutions in Dark-Fluid Cosmology

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The scale-free nature of gravitational interaction in both Newtonian gravity and the general theory of relativity gives rise to the concept of self-similarity, where solutions replicate themselves as the scale varies. As a result of this property, the governing partial differential equations are greatly simplified. Moreover, certain self-similar solutions can describe the asymptotic behaviors of more general solutions. However, there are situations where similarity is partially broken, these are called kinematic self-similar solutions. These kinds of solutions have a wide application in cosmology and mathematical general relativity. We used self-similar solutions to study dark-fluid-based cosmological models.

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