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1+1+2 covariant formulation of light propagation in cosmological models

Wednesday 25 September 2019 16:50 (20 minutes)

We present a covariant approach to the problem of light beam propagation in cosmological models. We develop our considerations within the framework of classical geometric optics in general relativity. Using the concept of screen surface orthogonal to the observer velocity and to the bundle of geodesics, we introduce covariant four-dimensional definitions for Sachs and Jacobi fields and for the area distance. Then we derive relationships between them and their propagation equations and initial conditions for these equations. Ultimately, for practical use, we transform the resulting formulas into a redshift dependent form.

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