

Part I

ABSTRACT

Some implications and consequences of the expansion of the universe are examined. In **Chapter 1** it is shown that this expansion creates grave difficulties for the Hoyle-Narlikar theory of gravitation. **Chapter 2** deals with perturbations of an expanding homogeneous and isotropic universe. The **conclusion** is reached that galaxies cannot be formed as a result of the growth of perturbations that were initially small. The propagation and absorption of gravitational radiation is also investigated in this approximation. In **Chapter 3** gravitational radiation in an expanding universe is examined by a method of asymptotic expansions. The 'peeling-off' behaviour and the asymptotic group are derived. **Chapter 4** deals with the occurrence of singularities in cosmological models. It is shown that a singularity is inevitable provided that certain very general conditions are satisfied.

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