Cosmological Models in AP-Spaces

M.I.Wanas
(Astronomy and Meteorology Department, Faculty of Science,Cairo University, , Giza, Egypt. E.mail wanas@frcu.eun.eg)

Abstract

To solve some of the problems of standard cosmology, the Absolute Parallelism (AP) space is used to construct alternative field theories other than GR. Four different field theories are being reviewed. The consequences of their cosmological applications are being compared with those of GR. The results are promising and show that more investigations, concerning this space, are needed, especially generalization of the singularity theorems.

Most of the cosmological models are built using the General Theory of Relativity (GR). The most successful and famous is the standard Big Bang model. This model gained its success from its predictions of the CMBR, confirmed observationally, and the abundance of light elements in our Universe. Although the model is successful, it suffers from some problems (e.g. singularity, horizon, flatness,...). In order to go around these problems, some authors (cf. [1]) suggested the modifications of the model. Others (cf. [2]) proposed the construction of field theories other than GR. They suggested either to extend the field equations of GR (cf. [3]), or to extend its geometric structure (cf. [4]).

We believe that the Absolute Paralellism (AP) geometry (cf. [5]) is a good candidate for this purpose. Some authors started constructing field theories (cf. [6]) using this geometry. The cosmological applications of such theories are promising. Some of the problems of the standard cosmology are removed. For example the problem of creation of matter [7], the horizon and flatness problems [8], were removed using these models.

We still hope that other problems of standard cosmology might find a solution within the framework of theories constructed in the AP-geometry.

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For instance the singularity problem which needs some efforts to generalize the singularity theorems (cf. [9]), in the AP-geometry. This work is in progress now.

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