Letter:

The germ-enfolded metric of Big Bang in Thoms catastrophic theory as a FRW-description

Abstract:

The Big Bang of universe can described over the enfolding of a germ of an elliptic umbilic point in Thoms catrastrophic theory. The controlling variables of this state can be seen as the important metric parameters of Einstein field-equation of GRT. This metric term can be described in the following as a FRW-description.

Key-words:

elliptic umbilic point; FRW-metric; enfolding metric; Big Bang; catastrophic theory.

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1. Introduction:

In two former articles [1.],[2.] the universe was described as an elliptic umbilic point of Thoms catastrophic theory. This description leads to a metric which includes the three variables of GRT as control parameters of the enfolding. These terms are: Ricci-scalar, cosmological constant and norm of Ricci-tensor. The enfolding leads to a metric which now can be described as a FRW-lineelement [3.],[4.].

2. Methods/Calculation:

Well-known is the FRW-metric as a consistent description of universe [5.]. This metric can be compared with the metric coming from the elliptic umbilic point. Both metrics can be coupled to clear the meaning of the several single terms. The FRW-metric [6.] in standard terms of polar coordinates is:

$$ds^2{}_1 = -c^2 \cdot dt^2 + a^2(t) \cdot \left[\frac{dr^2}{1 - \frac{k \cdot r^2}{R^2{}_C}} + r^2 \cdot d\Theta^2 + r^2 \cdot \sin^2 d\Theta \cdot d\Phi^2 \right] \qquad (1a.)$$

but the metric of the enfolding is:

$$ds^2_2 = g_{\mu\mu} c^2 \cdot dt^2 - g_{\nu\nu} \cdot \left[dr^2 - 2 \cdot \frac{r + c \cdot dt}{\sqrt{\|R_{\mu\nu}\|}} + \frac{1}{R} + \frac{c \cdot dt}{\Lambda \cdot r} \right]$$

(1b.)

Then there can be made a comparison of the several single coefficients of both equations, which leads to the following statements:

$$I : \frac{1}{1 - \dfrac{k \cdot r^2}{R^2_C}} = \frac{- d\Theta^2 \cdot dr^2 \cdot \sqrt{\|R_{\mu\nu}\|}}{2 \cdot (dr + c \cdot dt)}$$

(2a.)

$$II : a^2(t) = \frac{(\sin^2 d\Theta \cdot d\Phi^2) \cdot (2 \cdot (dr + c \cdot dt))}{\left(\dfrac{1}{R} + \dfrac{c \cdot dt}{\Lambda\, dr} \right) \cdot d\Theta \cdot \sqrt{\|R_{\mu\nu}\|}}$$

(2b.)

with:

$$g_{\nu\nu} = \frac{- a^2(t)}{1 - \dfrac{k \cdot r^2}{R^2_C}} = \frac{a^2(t) \cdot dr^2 d\Theta^2 \cdot \sqrt{\|R_{\mu\nu}\|}}{2 \cdot (dr + c \cdot dt)} = \frac{- dr^2 \cdot \sin^2 d\Theta\, d\Phi^2}{\dfrac{1}{R} + \dfrac{c \cdot dt}{\Lambda \cdot dr}}$$

(3.)

3. Discussion:

There can be seen, that the metric, which comes from the enfolding of a germ of an elliptic umbilic point in Thoms catastrophic theory can be written as an ordinary common FRW-metric, if some of the coefficients are compared with one another. This fact may lead to the conviction, that the method to describe the Big Bang by a germ and an enfolding of an elliptic catastrophe is consistent in some logical and mathematical form which also leads to a description of convincing physics.

4. References:

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November 2025