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A Plane Symmetric Viscous Fluid Cosmological Model in Biometric Theory of Gravitation Recent Trends and Futuristic Science Devlopment

P. K. Pathak
Research Student Mangalum Park 3 Geneshpur Wani, Yavatmal , Maharashtra, India

ABSTRACT

This document provides some minimal guidelines (and requirements) for writing a research paper. Issues related to the contents, originality, contributions, organization, bibliographic information, and writing style are briefly covered. Evaluation criteria and due dates for the research paper are also provided.

Keywords: Research Paper, Technical Writing, Science, Engineering and Technology

I. INTRODUCTION

Through the Einstein theory of relativity is one of the successful theory of gravitation and is consistent with an experimental data , and also have relation with the big bang theory of general theory of relativity. The several theory like Rosen`s (1974) bimetric theory of gravitation, fundamentally these bimetric theory of gravitation is depend upon the two tensor g_{ij} *and* γ_{ij} namely metric tensor and flat tensor. The metric tensor determine the Riemannian geometry of the curved space time which is plays the same role given an in Einstein`s general relativity. The flat space time metric interact with Riemannian metric but not directly with matter. A research in such a futuristic models and sciences we really developed a best future material and trends helps for development of society.

$$ds^2 = g_{ij}dx^i dx^j \qquad (1)$$

$$d\eta^2 = \gamma_{ij}dx^i dx^j \qquad (2)$$

The Rosen`s field equations (1974) in bimetric theory of gravitation are

$$N_j^i - \frac{1}{2}N\delta_j^j = -8\pi T_i^j \qquad (3)$$

Where $N_j^i = \frac{1}{2}\ \gamma^{\alpha\beta}$,$N = g^{ij}N_{ij}$ is the Rosen scalar. Here and hereafter the vertical bar(I) stands for γ-covariant differentiations where $g = det(g_{ij})$ and γ= $\det(\gamma_{ij})$ .many author like Rosen (1974,1977) ,Karade (1980) have developed many bianchi types and bulk viscous fluid models in general theory of relativity . in this paper , we studid plane symmetric cosmological model in the presence of viscous fluid in bmetric theory of gravitation and also these material used in future to developed the futuristic material ,used in newly born scientific idea of material development.

$$ds^2 = A^2(dx^2 - dt^2) + B^2dy^2 + C^2dz^2 \qquad (4)$$

Where ,A,B,C are function of t only

The stress energy –tensor T_j^i in the presence of bulk stress given by

$$d\sigma^2 = -dt^2 + dx^2 + dy^2 + dz^2 \qquad (5)$$

The field equations of the Rosen`s biometric theory of gravitation

$$K_j^i = N_j^i - \frac{1}{2}Ng_j^i = -8\pi kT_j^i \qquad (6)$$

$$N_j^i = \frac{1}{2}\gamma^{\alpha\beta}\left(g^{hj}ghi|\alpha\right)|\beta \qquad (7)$$

And $N = N_\alpha^\alpha$,K= $(\frac{g}{\gamma})^{\frac{1}{2}}$ Where, $g = det(g_{ij})$ and γ=det(γ_{ij}) **(8)**

The equation if state for wet dark fluid is $T_i^j = (p+\rho)u_i u^j + p g_i^j$ **(9)**

Where $u_i u^j = -1$,p= proper pressure,ρ=proper density $T_1^1 = T_2^2 = T_3^3 = p,\ and\ T_4^4 = -\rho$ Using equation (7) with (1) and (2) we get

$$N_i^j = \frac{1}{2}\gamma^{\alpha\beta}\left(g_{|\beta}^{h1} g_{|\alpha} + g^{h1} g_{h1|4|4}\right)$$

$$N_i^j = \frac{1}{2}\gamma^{44}\left(g_{|4}^{11} g_{|4} + g^{11} g_{11|4|4}\right)$$

$$N_1^1 = -\frac{1}{2}\left[\frac{\dot{A}^2}{A^2} - \frac{\ddot{A}}{A}\right] \quad \textbf{(10)}$$

$$N_2^2 = -\frac{1}{2}\left[\frac{\dot{B}^2}{B^2} - \frac{\ddot{B}}{B}\right] \quad \textbf{(11)}$$

$$N_3^3 = -\frac{1}{2}\left[\frac{\dot{C}^2}{C^2} - \frac{\ddot{C}}{C}\right] \quad \textbf{(12)}$$

$$N_4^4 = -\frac{1}{2}\left[\frac{\dot{A}^2}{A^2} - \frac{\ddot{A}}{A}\right] \quad \textbf{(13)}$$

N=$N_1^1 + N_2^2 + N_3^3 + N_4^4$

$$N = \left[\frac{2\dot{A}^2}{A^2} - \frac{2\ddot{A}}{A}\right] + \left[\frac{\dot{B}^2}{B^2} - \frac{\ddot{B}}{B}\right] + \left[\frac{\dot{C}^2}{C^2} - \frac{\ddot{C}}{C}\right] \quad \textbf{(14)}$$

Solving these we get the non-vanishing solution of N_j^i then let form equation

$$K_1^1 = \left[\frac{\dot{B}^2}{B^2} - \frac{\ddot{B}}{B}\right] + \left[\frac{\dot{C}^2}{C^2} - \frac{\ddot{C}}{C}\right] = 16\,\pi\kappa p \quad \textbf{(15)}$$

$$K_2^2 = \left[\frac{2\dot{A}^2}{A^2} - \frac{2\ddot{A}}{A}\right] + \left[\frac{\dot{B}^2}{B^2} - \frac{\ddot{B}}{B}\right] + \left[\frac{\dot{C}^2}{C^2} - \frac{\ddot{C}}{C}\right] = 16\,\pi\kappa p \quad \textbf{(16)}$$

$$K_3^3 = \left[\frac{2\dot{A}^2}{A^2} - \frac{2\ddot{A}}{A}\right] + \left[\frac{\dot{B}^2}{B^2} - \frac{\ddot{B}}{B}\right] + \left[\frac{\dot{C}^2}{C^2} - \frac{\ddot{C}}{C}\right] = 16\,\pi\kappa p \quad \textbf{(17)}$$

$$K_4^4 = \left[\frac{\dot{B}^2}{B^2} - \frac{\ddot{B}}{B}\right] + \left[\frac{\dot{C}^2}{C^2} - \frac{\ddot{C}}{C}\right] = -16\,\pi\kappa\rho \quad \textbf{(18)}$$

Equation (15) and (18) we finds the solution in the form of

$$p + \rho = 0 \quad \textbf{(19)}$$

For reality $p \geq 0\ and\ \rho \leq 0$ thus in this model perfect fluid does not exist.

For vacuum case $p = \rho = 0$,the field equations admits the solution of the form

Case: $A = e^{m_1 t + n_1 t}, B = e^{m_2 t + n_2 t}, C = e^{m_3 t + n_3 t}$ put in equation

$$ds^2 = e^{m_1 t + n_1 t}(\boldsymbol{dx^2} - \boldsymbol{dt^2}) + e^{m_2 t + n_2 t}\boldsymbol{dy^2} + e^{m_3 t + n_3 t}\,\boldsymbol{dz^2} \quad \textbf{(20)}$$

Where $m_1 = m_2 = m_3 = m$ and n_1, n_2, n_3 absorbing

$$ds^2 = e^{Mt}[= -\boldsymbol{dt^2} + \boldsymbol{dx^2} + \boldsymbol{dy^2} + \boldsymbol{dz^2}] \quad \textbf{(21)}$$

At singularity t=0

$$\boldsymbol{ds^2} = -\boldsymbol{dt^2} + \boldsymbol{dx^2} + \boldsymbol{dy^2} + \boldsymbol{dz^2} \quad \textbf{(22)}$$

II. CONCLUSION

Here we have constructed a plane symmetric cosmological model in Rosen[16] biometric theory of gravitation with a new equation of the dark energy component of the universe .it is observed that the plane symmetric cosmological model does not exist in biometric theory of gravitation with wet dark fluid as a source of gravitation and only vacuum model is obtained that experiment can show that if abny type of media helpsto study the new assumption of a 2d and 3d models.

III. REFERENCES

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