Abstract

An exact solution of the vacuum Einstein field equations (VEFEs) has been obtained of a spatially homogeneous and anisotropic (SHA) Bianchi type-I cosmological model by Kasner. The Kasner metric is shown to be a special case, and the exact vacuum solution of Kasner form model is obtained. Some physical properties of the model have been discussed.

References

1. Bicak, J. 1999. Selected solutions of Einsteins field equations: their role in general relativity and astrophysics. In Einsteins field equations and their physical implications. Springer, pp. 1–126.
2. Deruelle, N., and Sasaki, M. 2003. Newtons law on an Einstein gauss-bonnet brane. Progress of theoretical physics, Volume 110, No. 3, pp. 441–456.
3. Hasmani, A. H., and Al-Haysah, A. M. 2019. Exact solutions for Bianchi type-I cosmological models in f(R) theory of gravity. Applications and Applied Mathematics: An
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International Journal (AAM), Volume 14, No. 1, pp. 334–348.

4. Hasmani, A. H. 2010. Algebraic computation of newmannpenrose scalars in general relativity using mathematica. Journal of Science, Volume 1, pp. 82–83.

5. Hasmani, A. H., and Rathva, G. A. 2007. Algebric computations in general relativity using mathematica. Prajna-J. of Pure and Applied Sciences, Volume 15, No. 111, pp. 77–81.

6. Belinskii, V. A., Khalatnikov, I. M., and Lifshitz, E. M. 1970. Oscillatory approach to a singular point in the relativistic cosmology. Advances in Physics, Volume 19, No. 80, pp. 525–573.

7. Belinskii, V. A., Khalatnikov, I. M., and Lifshitz, E. M. 1982. A general solution of the Einstein equations with a time singularity. Advances in Physics, Volume 31, No. 6, pp. 639–667.

8. Lifshitz, E. M., Khalatnikov, I. M., Beeby, J., et al. 1992. Investigations in relativistic cosmology. In Perspectives in Theoretical Physics. Elsevier, pp. 527–597.

9. Taub, A. H. 1951. Empty space-times admitting a three parameter group of motions. Ann. Math, Volume 53, No.3, pp. 472–490.

10. Harvey, A. 1990. Will the real kasner metric please stand up. General Relativity and Gravitation, Volume 22, No. 12, pp. 1433–1445.

11. Kamenshchik, A. Y., and Vardanyan, T. 2019. Exact solutions of the Einstein equations for an infinite slab with a constant energy density. Physics Letters B, Volume 792, pp. 430–435.

12. Weyl, H. 1917. Zur gravitationstheorie. Annalen der Physik, Volume 359, No. 18, pp. 117–145.

13. Levi-Civita, T. 1918 Levi-civita rend. acc. lincei 27, 220; levicivita, t.(1918). Rend. Acc. Lincei, Volume 27, pp. 240–252.

14. Giovanni, M., Valerio, B. M., and Riccardo, B. 2011. Primordial cosmology. World Scientific.

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