LRS BIANCHI TYPE-I INHOMOGENEOUS ANISOTROPIC COSMOLOGICAL MODELS WITH PERFECT FLUID

Dr. Manjusha (Hajare) Borkar

Assistant Professor, Kamla Nehru Mahavidyalaya,

Nagpur, 440024, Maharashtra, India

Abstract: The present study deals with inhomogeneous anisotropic locally rotationally symmetric (LRS) Bianchi Type-I space time with perfect fluid. It is discussed that when the metric potential B be a separable function of x and t, then the field equation and conservation equations are solvable. Some physical properties of the solutions are also discussed.

Key Words: LRS Bianchi Type-I models, general relativity, cosmological model.

Introduction

It is most important to study the problems related to inhomogeneous and anisotropic space-time to know about the formation of galaxies and the process of homonization and isotropization of the universe. Here we consider locally rotationally symmetric (LRS) Bianchi Type-I space time to study inhomogeneity. The process of isotropization of the universe can be studied through the Bianchi type cosmological models which are homogeneous and anisotropic. Anisotropic universe has more generality than isotropic models. Hence these models are suitable models of our universe, because of the simplicity of field equations.

In this note, we discuss about LRS Bianchi type-I cosmological space times in general relativity. Mazumdar [1] has obtained cosmological solutions for LRS Bianchi type-I space-time filled with a perfect fluid with arbitrary cosmic scale functions and studied kinematic properties of the particular form of the solution. Mohanti [2,3] also obtained some solutions for the same field equations by using solution generation technique with the matter perfect fluid. Her we have taken an attempt to solve the field equation to obtain general solutions of this problem, when the space-time is inhomogeneous and anisotropic. Also studied some physical and geometrical properties of the solutions.

1. Einstein Field Equations

The metric of inhomogeneous and anisotropic space time is

$$ds^2 = dt^2 - A^2 dx^2 - B^2(dy^2 + dz^2) \tag{1}$$