South East Asian J. Math. & Math. Sc.
Vol.6 No.1(2007), pp.95–104

RADIAL VIBRATION OF MAGNETO-VISCO-ELASTIC CYLINDRICAL SHELL

Surya Narain and Neena Sinha

Department of Mathematics
Harishchandra P.G. College, Varanasi, U.P., India

(*Received: March 03, 2006*)

Abstract: This paper investigates the radial vibration of magneto visco-elastic shell. The material of the shell being aeolotropic and density ρ of the shell varies as $\rho = \rho_0 r^n$, where ρ_0 is constant and n is any integer. Lastly, frequency equation have been derived.

Keywords and Phrases: Radial vibration, magneto visco-elastic shell, frequency equation
2000 AMS Subject Classification: 74J15, 74D05

1. Introduction

Recently, a great deal of activity has emerged in the study of interaction of elastic and electromagnetic fields due to their extensive applications in science and technology. Kaliski [1], Narain [3,4], Narain and Srivastava [5], Narain and Verma [6,7], Nowacki [8], Nowacki and Kaliski [9], Paria [10] and many other have investigated the problems concerning elastic and electromagnetic fields. Sequal to there, the present paper in an attempt to investigate radial vibration of megneto-visco-elastic shell. The material of the shell being aeolotropic and density of the shell to be varying as the integral power of radius vector in the form $\rho = \rho_0 r^n$ where ρ_0 is constant and n is any integer. Frequency equation in several cases have been derived.

2. Fundamental Equations and Boundary Conditions

We consider aeolotropic visco-elastic prefectly conducting cylindrical shell of inner radius r_1 and outer radius r_2, and assumed that the space outside the shell to be surrounded by vacuum. We also consider that the boundary of the shell is mechanically stressed free. Initially, there exists an axial magnetic field of intensity $\vec{H}$ in the shell. The constituting relation for aeolotropic visco-elastic bodies in cylindrical co-ordinates (r, θ, z) may be written as