

SIRS MODEL WITH NON-HOMOGENEOUS TRANSMISSION FUNCTION

HARSHA MEHTA¹, BIJENDRA SINGH² AND NEETU TRIVEDI³

^{1,2} School of Studies in Mathematics,

Vikram University, Ujjain (M.P.), 456010, India

³ B M College, Indore (M.P.), 452022, India

E-mail: ¹ harshi_sona1984@yahoo.co.in, ² bijendrasingh@yahoo.com,

³ neetutrivedi17@gmail.com

Abstract

An SIRS model with a non-homogeneous transmission function is analyzed. Asymptotic stability for both disease free and interior equilibrium is discussed. To support the analysis, numerical simulations are also performed. The results are compared with the model when the disease transmission is asymptotically homogeneous function. When the transmission is asymptotically homogeneous there exists a unique endemic equilibrium. When this function is considered as non-homogeneous, a backward bifurcation is observed and results in the existence of two equilibrium positions. No appreciable change in the variation of equilibrium has been observed, however the endemic equilibrium level goes slightly down.

Key Words : *Epidemiology, stability, Biological equilibrium, Infectious diseases.*

AMS Subject Classification : 92D30.