

**HOPF BIFURCATION ANALYSIS IN THREE SPECIES
ECOLOGICAL MODEL**

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Abstract: In this work we proposed a three species ecological model with a prey, predator and competitor. Distributed type of delay is incorporated in the interaction of prey and competitor species is taken for investigation. The system dynamics is studied at its interior equilibrium point with exponential type of delay kernel. The effect of Time delay on the dynamical behavior of the system is studied using Numerical simulation. It is observed that Hopf bifurcation exist for the system for different kernel strengths.

Keywords and Phrases: Co-existing state, local stability, global stability, Time delay, hopf bifurcation.

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1. Introduction

Mathematical modeling in Ecology gains importance in recent decades. The stability analysis of ecosystems is quite intersecting and complex in nature. Differential equations are widely used in the stability analysis. Braun [8] and Simon's [9] explain the applications of differential equations in this area. Lokta [1] and Volterra [2] studied the different models in population ecology. Kapur [3, 4] discussed the models in biology, medicine, epidemiology, ecology etc. May [5], Freedman [6],