

INTISARI

KAJIAN DINAMIKA POPULASI PREDATOR-MANGSA MENGUNAKAN PERSAMAAN LOTKA-VOLTERRA

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Telah dikaji dinamika populasi predator-mangsa dengan model Lotka-Volterra beserta fenomena-fenomena nonlinear di dalamnya. Fenomena-fenomena nonlinear yang dikaji meliputi efek logistik, kompetisi, dan dinamika *cyclic* pada model Lotka-Volterra. Efek logistik atau sering disebut model logistik merupakan model pertumbuhan spesies tunggal dengan kapasitas pembawa sebagai kapasitas spesies pada keadaan kesetimbangan. Efek logistik pada model Volterra akan menghasilkan fenomena dinamika perilaku kompetisi. Dinamika perilaku kompetisi pada kasus dua dimensi mencakup fenomena koeksistensi dan degenerasi dengan β sebagai parameter interaksi antar spesies. Nilai β berpengaruh pada dinamika keseluruhan pada sistem yang ditinjau. Fenomena kompetisi dengan dinamika perilaku *cyclic* terjadi pada kasus predator-mangsa yang dikenal sebagai model Lotka-Volterra. Sebagai tambahan, dinamika perilaku spiral stabil didapatkan saat model Lotka-Volterra digabungkan dengan model logistik.

Kata-kata kunci : Lotka-Volterra, model logistik, Persamaan Diferensial Biasa (PDB) nonlinear.

ABSTRACT

A STUDY ON PREDATOR-PREY POPULATION DYNAMICS USING LOTKA-VOLTERRA EQUATION

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A study of population dynamics using Lotka-Volterra model with nonlinear phenomena inside it has been investigated. Nonlinear phenomena have been studied including logistic effect, competition, and cyclic dynamics of the Lotka-Volterra model. Logistic effect as known as logistic model is a single species growth model along with carrying capacity as species capacity at equilibrium state. Logistic effect in Volterra's model yields phenomena of competition behavior dynamics. Competition behavior dynamics at two-dimensional case include coexistence phenomena and degeneration with β as an interaction parameter between species. Value of β affects on overall dynamics in considered system. Competition phenomena with cyclic dynamical behavior occurred in predator-prey case known as the Lotka-Volterra model. In addition, spiral dynamical behavior is obtained when the Lotka-Volterra model is combined with the logistic model.

Keywords : Lotka-Volterra, Logistic model, Nonlinear ODE.