Dynamics of a Fractional Stage Structured Predator-Prey model with Prey Refuge

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Abstract: In this paper, a stage structured fractional predator-prey model with a prey refuge is investigated in terms of existence and uniqueness, positivity and boundedness of the solutions. It is called satge structured because prey population is composition of matured and immatured prey. Sufficient conditions are derived for existence and stability of various points of equilibrium. Finally theoretical results are strengthen with the help of numerical results obtained by using Trapezoidal Based Homotopy Perturbation Method.

Keywords: Predator-prey model, prey refuge, Caputo fractional derivative, Trapezoidal Based Homotopy Perturbation Method, Lyapunov function.