BLOW UP IN FINITE TIME OF SOLUTIONS TO A LESLIE-GOWER PREDATOR-PREY MODEL IN ABSCENCE OF THE MIDDLE PREDATOR.

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Abstract

In order to study the asymptotic behavior, several authors claimed global existence in time of solutions to a tritrophic food chain models following a modied Leslie-Gower formulation considering the interactions between three species: a generalist top predator depredating on a middle predator, that in turn is depreds a prey. To the contrary it is shown nite time blow-up in such models can occur. We show in this work that blow up in nite time persists even when the intermediate (middle) predator is abscent to the contrary to what it is claimed by Kundu and Patra (2022, [13]). It is shown under some restrictions on the parameters, the model has bounded solutions for all positive initial conditions. We show that this is not true. Solutions to the model can blow up in nite time, for initial data suciently large, even under the restrictions derived by the authors. We can show same results even for small initial data but we concentrate our proofs for the rst case. We also show similar results for the spatially extended system. We illustrate all our results through numerical simulations.

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