

PERMANENCE AND GLOBAL STABILITY IN GENERAL NON-AUTONOMOUS PREDATOR-PREY KOLMOGOROV SYSTEMS WITH OUTSIDE FOOD SOURCES⁰

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Abstract. In this paper, a non-autonomous predator-prey Kolmogorov system with outside food sources is considered. A set of sufficient conditions are established for the ultimate boundedness, permanence and global stability of the system. As applications of these results, the sufficient conditions on the permanence and global stability are obtained for Lotka-Volterra system, Beddington-DeAngelis function response system, Leslie-Gower and Holling-II type function response system and Holling (m, n)-type function response system.

Keywords. Kolmogorov system, predator-prey system, permanence, ultimate boundedness, globally stability, Lotka-Volterra system, function response system, Lyapunov function.

AMS (MOS) subject classification: 34C25, 34D05, 92D25, 92D30.

1 Introduction

The dynamic analysis between predators and their prey has long been and will continue to be one of the dominant themes in both ecology and mathematical ecology due to its universal existence and importance. In the last decade, many scholars have done many works on the permanence, stability, extinction and the existence of positive periodic solutions for predator-prey systems (see [1-3,7-10,12,14-17,19,21,29,30] and the references therein). In particular, Aziz-Alaoui and Daher Okiye [6] considered a predator-prey model with modified Leslie-Gower and Holling-type II scheme and given in terms of boundedness of solutions, existence of an attracting set and global stability of the coexisting interior equilibrium. Further, Nindjin and Aziz-Alaoui

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