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Extinction in two dimensional discrete Lotka-Volterra competitive system with the effect of toxic substances(II)

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Abstract. In this paper, we consider a two species non-autonomous discrete competitive phytoplankton system with one toxin producing phytoplankton. We show that for such kind of system, it is also possible one of the components be driven to extinction while the other one will be globally attractive with any positive solution of a discrete logistic equation under some conditions. Our results supplement the main results of Li and Chen [Zhong Li, Fengde Chen, Extinction in two dimensional discrete Lotka-Volterra competitive system with the effect of toxic substances, Dynamics of Continuous, Discrete and Impulsive Systems, Series B: Applications & Algorithms 15(2)(2008)165-178].
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References

[1] Z. Li, F. D. Chen, Extinction in two dimensional discrete Lotka-Volterra competitive system with the effect of toxic substances, Dynamics of Continuous,*Discrete and Impulsive Systems, Series B: Applications & Algorithms,* **15**(2) (2008) 165-178.

[2] F. D. Chen, Permanence and global attractivity of a discrete multispecies Lotka-Volterra competition predator-prey systems, *Appl. Math. Comput.,* **182**(1) (2006) 3-12.

[3] Y. M. Chen and Z. Zhou, Stable periodic solution of a discrete periodic Lotka-Volterra competition system, *J. Math. Anal. Appl.,* **277**(1) (2003) 358-366.

[4] H. F. Huo and W. T. Li, Permanence and global stability for nonautonomous discrete model of plankton allelopathy, *Appl. Math. Lett.,* **17** (2004) 1007-1013.

[5] Z. J. Liu and L. S. Chen, Positive periodic solution of a general discrete nonautonomous difference system of plankton allelopathy with delays, *J. Comput. Appl. Math.,* **197**(2) (2006) 446-456.

[6] Z. Zhou and X. Zou, Stable periodic solutions in a discrete periodic logistic equation, *Appl. Math. Lett.,* **16**(2) (2003) 165-171.

[7] Z. Li and F. D. Chen, Almost periodic solutions of a discrete almost periodic logistic equation, *Math. Comput. Modelling,* **50**(1-2) (2009) 254-259.

[8] F. D. Chen, Permanence for the discrete mutualism model with time delays, *Math. Comput. Modelling*, **47**(3-4) (2008) 431-435.

[9] F. D. Chen, Permanence of a single species discrete model with feedback control and delay, *Appl. Math. Lett.,* **20**(7) (2007) 729-733.

[10] X. X. Chen and F. D. Chen, Stable periodic solution of a discrete periodic Lotka-Volterra competition system with a feedback control, *Appl. Math. Comput.,* **181**(2) (2006) 1446-1454.

[11] J. Chattopadhyay, Effect of toxic substances on a two-species competitive system, *Ecol. Model.,* **84** (1996) 287-289.

[12] A. Mukhopadhyay, J. Chattopadhyay and P. K. Tapaswi, A delay differential equations model of plankton allelopathy, *Math. Biosci.,* **149** (1998) 167-189.

[13] Z. Li and F. D. Chen, Extinction in two dimensional nonautonomous Lotka-Volterra systems with the effect of toxic substances, *Appl. Math. Comput.,* **182** (2006) 684-690.

[14] J. Solé, E. Garca-Ladona, P. Ruardij, M. Estrada, Modelling allelopathy among marine algae, *Ecol. Model.,* **183** (2005) 373-384.

[15] M. Bandyopadhyay, Dynamical analysis of a allelopathic phytoplankton model, *J. Biol. Syst.*, **14**(2) (2006) 205-217.

[16] F. D. Chen, Average conditions for permanence and extinction in nonautonomous Gilpin-Ayala competition model, *Nonlinear Anal: Real World Appl.,* **7**(4) (2006) 895-915.

[17] F. D. Chen, Some new results on the permanence and extinction of nonautonomous Gilpin-Ayala type competition model with delays, *Nonlinear Anal: Real World Appl.,* **7**(5) (2006) 1205-1222.

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