J. Adv. Math. Stud.
Vol. **18**(2025), No. 1, 34-46
http://journal.fairpartners.ro

ON PREY-PREDATOR MODEL WITH LOGISTIC GROWTH RATE AND TRIANGULAR HERD SHAPE IN PREYS

TITLI MAITI AND AVIJIT SARKAR

Abstract. The object of the present article is to study prey-predator model with preys having logistic growth rate and moving in herd of triangular shapes. Stability and bifurcation analysis are provided with illustrating numerical simulations.

REFERENCES

[1] V. Ajraldi, M. Pittarino and E. Venturino: *Modelling Herd behavior in population system*, Nonlinear Anal. Real World Appl., **12**(2011), 2319-2338.
[2] S. Biswas, D. Pal, G.S. Mahapatra and G.P. Samanta: *Dynamics of a prey-predator system with herd behaviour in both and strong allee effect in prey*, Biophysics, **55**(2020), 826-835.
[3] P.A. Braza: *Predator-prey dynamics with square root functional response*, Nonlinear Anal. Real World Appl., **13**(2012), 1837-1843.
[4] C. Cosner and D.L. De Angelis: *Effects of spatial grouping on functional response of predator*, Theoretical Population Biology, **56**(1999), 65-75.
[5] S. Debnath, P. Majumdar, S. Sarkar and U. Ghosh: *Complex dynamical behaviour of a delayed prey-predator model with square root functional response in presence of fear in the prey*, Int. J. Modelling Simulat., **43**(2023), No. 5, 612-637.
[6] Y. Kuang and E. Beretta: *Global qualitative analysis of a ratio dependent predator-prey system*, J. Math. Biol., **36**(1998), 389-406.
[7] B. Mondal, S. Roy, U. Ghosh and P.K. Tiwari: *A systematic study of autonomous and non-autonomous predator prey models for the combined effects of fear, refuge, cooperation and harvesting*, Eur. Phys. J. Plus, **137**(2022), Art. No. 724, 23 pages.
[8] P. Saha, B. Mondal and U. Ghosh: *Dynamical behaviors of an epidemic and structural treatment in deterministic and stochastic environments*, Chaos Solitons Fractals, **174**(2023), Art. No. 113775.
[9] S. Wiggins, W. Stephen and G. Martin: *Introduction to Applied Nonlinear Dynamical Systems and Chaos. Second Edition*, New York, Springer, 2003 (TAM 2).

University of Kalyani
Department of Mathematics
Kalyani 741235, West Bengal, India
Email address: titli96.rahara@gmail.com

University of Kalyani
Department of Mathematics
Kalyani 741235, West Bengal, India
Email address: avjaj@yahoo.co.in

Received: August 14, 2024. *Revised*: December 02, 2024.
2020 *Mathematics Subject Classification*: 92B05, 93E15, 60H10, 34E10.
Key words and phrases: Prey-predator interactions, stability, Hopf bifurcation, herd behavior, herd boundary.

©2025 Fair Partners Society for the Promotion of Science & Fair Partners Publishers