

# UNIFORM PERSISTENCE IN A PREY-PREDATOR MODEL WITH DISEASE IN ONE POPULATION

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Following the theoretical approach to persistence mainly contained in [1] and [2] we give a formal explanation to the numerical results obtained in [3] regarding the “invasion condition” in a certain predator-prey model with functional response of Holling type II equipped with a infectious disease in one of the two populations.

The proof relies on several repelling conditions that can be applied in turn on a suitable Morse decomposition of the boundary. We take into account both infection cases and carry on a detailed stability analysis of the underlying infection-free model.

## References

- [1] Alessandro Fonda. (1988). *Uniformly persistent semidynamical systems*, Proceedings of the American Mathematical Society, 104 (1), 111–116.
- [2] Josef Hofbauer. (1989). *A unified approach to persistence*, Acta Applicandae Mathematicae, 14 (1-2), 11–22.
- [3] Andrew M. Bate and Frank M. Hilker. (2013). *Predator-prey oscillations can shift when diseases become endemic*, Journal of Theoretical Biology, 316, 1–8.