

Abstract Submitted
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Noise can speed up solitary waves in population genetics OSKAR HALLATSCHEK, Biological Physics and Evolutionary Dynamics, Max Planck Institute — While the deterministic behavior of solitary waves is well-understood, their noisy counterparts are still somewhat enigmatic. The current consensus is that number fluctuations due to discreteness substantially reduce the velocity of a traveling solitary wave. Here, we show that the very same fluctuations can sometimes increase the wave speed. In fact, we describe a new class of solitary waves whose velocity goes to zero as the noise vanishes (i.e., in the deterministic limit). The fluctuations due to discreteness drive these waves, and give them a finite velocity. We calculate the wave velocity analytically as a function of noise strength, and compare with simulations. The presented class of solitary waves naturally occurs in the context of genetics. They describe, for instance, the spread of a mutation that increases the dispersal rates or the carrying capacity. We discuss the biological implications of our results.

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