

Interplay of nonlinear diffusion, initial tails and Allee effect on the speed of invasions

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Abstract. We focus on the spreading properties of solutions of monostable equations with nonlinear diffusion. We consider both the porous medium diffusion and the fast diffusion regimes. Initial data may have heavy tails, which tends to accelerate the invasion phenomenon. On the other hand, the nonlinearity may involve a weak Allee effect, which tends to slow down the process. We study the balance between these three effects (nonlinear diffusion, initial tail, KPP nonlinearity/Allee effect), revealing the separation between “no acceleration” and “acceleration”. In most of the cases where acceleration occurs, we also give an accurate estimate of the position of the level sets.

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