Traveling waves of a reactive kinetic model for the Fisher-KPP equation

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The Fisher-KPP equation is a nonlinear reaction diffusion equation describing e.g. chemical reactions or population growth. We consider a kinetic model of the same situation, which is in terms of a small parameter scaled such that we recover the reaction diffusion equation in the macroscopic limit. A constructive existence proof of kinetic profiles close to traveling waves of the Fisher-KPP equation is presented. A main ingredient is a micro-macro decomposition in the spirit of the one introduced by Caflisch and Nicolaenko for the Boltzmann equation. The major difficulty causes the fact that in contrary to the previous works the problem under consideration is nonconserved. The existence result can be extended to also give strict monotonicity and therefore positivity of the density of the kinetic profile.