

Travelling waves in the Fisher-KPP equation with nonlinear diffusion and a non-Lipschitzian reaction term

Pavel Drábek¹, Peter Takáč²

SUMMARY

We consider a one-dimensional reaction-diffusion equation of Fisher-Kolmogoroff-Petrovsky-Piscounoff type. We investigate the effect of the interaction between the nonlinear diffusion coefficient and the reaction term on the existence and nonexistence of travelling waves. Our diffusion coefficient is allowed to be degenerate or singular at both equilibrium points, 0 and 1, while the reaction term need not be differentiable. These facts influence the existence and qualitative properties of travelling waves in a substantial way. See [1] for preliminary version of this work.

Keywords: Fisher-Kolmogoroff-Petrovsky-Piscounoff equation; travelling wave; degenerate and/or singular diffusion; non-smooth reaction term; existence and nonexistence of travelling waves; an overdetermined first-order boundary value problem.

AMS Classification: 35Q92, 92D25, 34B08

References

- [1] PAVEL DRABEK, PETER TAKAC. Travelling waves in the Fisher-KPP equation with nonlinear diffusion and a non-Lipschitzian reaction term. *arXiv:1803.10306 [math.AP]*, 20 pages, 2018.

¹Department of Mathematics and NTIS
University of West Bohemia
306 14 Plzeň, Czech Republic
email: pdrabek@kma.zcu.cz

²Institut für Mathematik
Universität Rostock
Ulmenstraße 69, Haus 3, 18055 Rostock, Germany
email: peter.takac@uni-rostock.de