

**Eva Fašangová**

*Asymptotic analysis for a nonlinear parabolic equation on  $\mathbb{R}$*

Comment.Math.Univ.Carolinae 39,3 (1998) 525-544.

**Abstract:** We show that nonnegative solutions of

$$\begin{aligned}u_t - u_{xx} + f(u) &= 0, & x \in \mathbb{R}, & \quad t > 0, \\u &= \alpha \bar{u}, & x \in \mathbb{R}, & \quad t = 0, \quad \text{supp } \bar{u} \text{ compact}\end{aligned}$$

either converge to zero, blow up in  $L^2$ -norm, or converge to the ground state when  $t \rightarrow \infty$ , where the latter case is a threshold phenomenon when  $\alpha > 0$  varies. The proof is based on the fact that any bounded trajectory converges to a stationary solution. The function  $f$  is typically nonlinear but has a sublinear growth at infinity. We also show that for superlinear  $f$  it can happen that solutions converge to zero for any  $\alpha > 0$ , provided  $\text{supp } \bar{u}$  is sufficiently small.

**Keywords:** parabolic equation, stationary solution, convergence

**AMS Subject Classification:** 35B40, 35K55, 35B05