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Interior gradient blow-up in a semilinear parabolic equation. (English) Zbl 0864.35052

Differ. Integral Equ. 9, No. 5, 865-877 (1996).

Author's abstract: We present a one-dimensional semilinear parabolic equation for which the spatial derivative of solutions becomes unbounded in finite time while the solutions themselves remain bounded. In our example, the derivative blows up in the interior of the space interval rather than at the boundary, as in earlier examples. In the case of monotone solutions we show that gradient blow-up occurs at a single point, and we study the shape of the singularity. Our argument for gradient blow-up also provides a pair of "naive viscosity sub- and super-solutions" which violate the comparison principle.

Reviewer: C.Y.Chan (Lafayette)

MSC:

[35K55](#) Nonlinear parabolic equations

[35B40](#) Asymptotic behavior of solutions to PDEs

Cited in **1** Review
Cited in **17** Documents

Keywords:

traveling wave solutions; violation of the maximum principle; interior blow-up; limiting profile