

论文

带时滞的退化非线性抛物方程的熄灭

陈友朋, 谢春红

南京师范大学数学系 江苏南京 210097 盐城师范学院数学系 江苏盐城 224002 南京大学数学系 江苏南京 210093

摘要:

该文研究一带时滞的退化非线性抛物方程的初边值问题。运用正则化方法和上下解技巧证明了上述问题的古典正解的局部存在性及其可延拓性。讨论了整体存在性和有限时刻熄灭,建立了临界长度,得到了熄灭点的位置以及特殊f(u)情形下的熄灭速率估计。

关键词: 退化抛物方程;时滞;上下解;临界长度;熄灭速率

分类号:

35K55; 35K65

Quenching for a Nonlinear Degenerate Parabolic Equation with Time Delay

CHEN You-Peng, XIE Chun-Hong

Abstract:

This paper deals with the initial boundary value problem of a nonlinear degenerate parabolic equation with time delay. The method of regularization and the technique of upper and lower solutions are employed to show the local existence and the continuation of the positive classical solution of the above problem. The global existence and finite time quenching are discussed, and the critical length is established. The location of the quenching points and the estimates of the quenching rate for the special case of f(u) are obtained.

Keywords: Degenerate parabolic equation Time delay Upper and lower solutions Critical length Quenching rate

收稿日期 修回日期 网络版发布日期

DOI:

基金项目:

通讯作者:

作者简介:

参考文献:

[1]Pao C V. Nonlinear Parabolic and Elliptic Equations. New York: Plenum Press, 1992

[2]Sheng Q, Khaliq A Q. A compound adaptive approach to degenerate nonlinear quenching problems. Numer Methods for Partial Differential Equations, 1999, 15: 29-47

[3]Kawarada, H. On solutions of initial boundary problem for $u_t = u_{xx} + 1/(1-u)$. Publ RIMS Kyoto Univ, 1975, 10: 729-736

[4]Acker A, Walter W. The quenching problem for nonlinear partial differential equations. Berlin: Springer, 1976

扩展功能

本文信息

- ▶ Supporting info
- ▶ PDF (394KB)
- ▶ [HTML全文]
- ▶ 参考文献

服务与反馈

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ 引用本文
- ▶ Email Alert
- ▶ 文章反馈
- ▶ 浏览反馈信息

本文关键词相关文章

- ▶ 退化抛物方程;时滞;上下解;临界长度;熄灭速率

本文作者相关文章

- ▶ 陈友朋
- ▶ 谢春红

PubMed

- ▶ Article by Chen, Y. P.
- ▶ Article by Xie, C. G.

[5]Levine H A.Quenching, nonquenching,and beyond quenching for solutions of some parabolic equations. Annali di Mat pura et Appl,1989,155: 243-260

[6]Dai Qiuyi,Gu Yonggeng. A short note on quenching phenomena for semilinear parabolic equations. J Differential Equations, 1997,137: 240-250

[7]Chan C Y,Kong P C.Quenching for degenerate semilinear parabolic equations. Applicable Analysis,1994, 54: 17-25

[8]Ke L,Ning S.Quenching for degenerate parabolic equations. Nonlinear Analysis, 1998,34: 1123-1135

[9]Pao C V. Quenching problem of a reaction diffusion equation with time delay. Nonlinear Analysis, 2000, 41: 133-142

[10]Friedman A. Partial Differential Equations of Parabolic Type. Englewood Cliffs: Prentice Hall Inc,1964

[11]Floater M S.Blow up at the boundary for degenerate semilinear parabolic equations. Arch Rat Mech Anal,1991, 114: 57-77

[12]Chen Y P.Quenching problem of a kind of degenerate reaction diffusion equations. Journal of Nanjing University Mathematical Biquarterly,1999,16(1): 133-143

[13]Friedman A,McLeod B.Blow up of positive solutions of semilinear heat equations. Indiana Univ Math J, 1985,34: 425-447

本刊中的类似文章

文章评论 (请注意:本站实行文责自负, 请不要发表与学术无关的内容!评论内容不代表本站观点.)

反馈人	<input type="text"/>	邮箱地址	<input type="text"/>
反馈标题	<input type="text"/>	验证码	<input type="text" value="8002"/>