

Blow Up And Global Existence In A Nonlinear Viscoelastic Wave Equation

Messaoudi, SA

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King Fahd University of Petroleum & Minerals

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Summary

In this paper the nonlinear viscoelastic wave equation $u_{tt} - \Delta u + \int_0^t g(t-\tau)\Delta u(\tau) d\tau + a|u|^{m-2}u = b|u|^{p-2}u$ associated with initial and Dirichlet boundary conditions is considered. Under suitable conditions on g , it is proved that any weak solution with negative initial energy blows up in finite time if $p > m$. Also the case of a stronger damping is considered and it is showed that solutions exist globally for any initial data, in the appropriate space, provided that $m > p$. (C) 2003 WILEY-VCH Verlag GmbH Co. KGaA, Weinheim.

References:

1. AASSILA M, 2000, SIAM J CONTROL OPTIM, V38, P1581
2. BALL JM, 1977, Q J MATH, V28, P473
3. CAVALCANTI MM, 2001, DIFFERENTIAL INTEGRA, V14, P85
4. CAVALCANTI MM, 2001, MATH METHOD APPL SCI, V24, P1043
5. CAVALCANTI MM, 2002, ELECT J DIFFE EQNS, V44, P1
6. GEORGIEV V, 1994, J DIFFER EQUATIONS, V109, P295
7. HARAUX A, 1988, ARCH RATIONAL MECH A, V100, P191
8. KALANTAROV V, 1978, J SOVIET MATH, V10, P53
9. KOPACKOVA M, 1989, COMMENT MATH U CAROL, V30, P713
10. LEVINE HA, 1974, SIAM J MATH ANAL, V5, P138
11. LEVINE HA, 1974, T AM MATH SOC, V192, P1
12. LEVINE HA, 1997, ARCH RATION MECH AN, V137, P341
13. LEVINE HA, 1998, J MATH ANAL APPL, V228, P181
14. LIU W, 1998, ELECT J DIFFERENTIAL, V17, P1
15. LIU W, 1998, ESAIM CONTR OPTIM CA, V3, P23
16. LIU WJ, 1998, J MATH PURE APPL, V77, P355
17. MESSAOUDI SA, 2001, MATH NACHR, V231, P1

18. MUNOZ RJE, 1996, J ELASTICITY, V44, P61
19. VITILLARO E, 1999, ARCH RATION MECH AN, V149, P155
20. ZUAZUA E, 1990, COMMUN PART DIFF EQ, V15, P205

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