

Singular limits in the Cauchy problem for the damped extensible beam equation

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Abstract We discuss the Cauchy problem of the Ball model for an extensible beam ([1]):

$$\rho \partial_t^2 u + \partial_t u + \partial_x^4 u + \eta \partial_t \partial_x^4 u = \left(1 + \int_{\mathbb{R}} |\partial_x u|^2 dx + \eta \int_{\mathbb{R}} \partial_x u \partial_t \partial_x u dx \right) \partial_x^2 u, \quad \text{in } \mathbb{R}^+ \times \mathbb{R}.$$

The aim is to investigate uniform singular limits as $\rho \rightarrow 0$ for the problem with the help of decay estimates. We will focus on introducing how to obtain the decay estimates for the limiting problem in $\rho = 0$ but $\eta > 0$. This talk is based on the results in [2] and [3].

BIBLIOGRAPHY

- [1] J. Ball, *Stability theory for an extensible beam*, Journal of Differential Equations, **42**, 61-90 (1973).
- [2] R. Racke and S. Yoshikawa, *Singular limits in the Cauchy problem for the damped extensible beam equation*, accepted for publication in: Journal of Differential Equations.
- [3] R. Racke and S. Yoshikawa, *Decay estimates for the Cauchy problem for the damped extensible beam equation*, submitted.