
SUFFICIENT CONDITION FOR THE EXISTENCE OF TRAVELLING WAVES IN SUSPENSION BRIDGES VIA MOUNTAIN PASS THEOREM

Hana Levá

We study the existence of travelling wave solutions of the boundary value problem for fourth–order partial differential equation with jumping nonlinearity in the form

$$u_{tt} + u_{xxxx} + \alpha u^+ - \beta u^- + g(u) = 1, \quad x \in \mathbb{R}, t > 0, \quad (1)$$

where $\alpha, \beta > 0$. It can be used as a generalized model of a suspension bridge or as a model of an asymmetrically supported bending beam.

Allowing the presence of the term βu^- in (1) results in restrictions for the values of travelling wave speed, in particular there appears a strictly positive lower bound. Our aim is to find the optimal one while using Mountain Pass Theorem. Within the work, there also appear some important related problems which help us to describe the searched set of admissible values of the wave speed.

This is a joint work with Gabriela Holubová and Petr Nečesal (University of West Bohemia).

Hana Levá, Department of Mathematics and NTIS, Faculty of Applied Sciences, University of West Bohemia, Czech Republic
e-mail : levah@kma.zcu.cz
