Variational Methods for a Generalized Semilinear Wave Equation

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Abstract

We study the equation

\[(\partial^2_t + d(t)(-\partial_x^2 + \alpha x^2)^2) u = d(t)|u|^{p-1}u \quad \text{on } \mathbb{R}^2, \tag{1}\]

where \(p \in (1, \infty), \alpha > 0\) and \(d\) is a positive periodic step potential. By using variational methods we look for non-trivial solutions of (1). The main difficulty is to verify a spectral condition of the linear part of (1) to obtain a suitable functional analytic setting for our variational method. Then one can find solutions of (1) as a critical point of an appropriate functional. This is ongoing research.