Phase space derivation of a variational principle for one-dimensional Hamiltonian systems

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Abstract

We consider the bifurcation problem $u'' + \lambda u = N(u)$ with two point boundary conditions where $N(u)$ is a general nonlinear term which may also depend on the eigenvalue λ. A new derivation of a variational principle for the lowest eigenvalue λ is given. This derivation makes use only of simple algebraic inequalities and leads directly to a more explicit expression for the eigenvalue than what had been given previously.