



On the stability analysis of strongly nonlinear coupled Hill's Equations

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Abstract:

The stability of periodic solutions of non-linear differential equations with periodic coefficients has been of interest in mathematical physics for many years. The goal of this work is to continue our investigations to stability properties of some fundamental periodic solutions of strongly non-linear coupled Hill's equations. To achieve this goal, we first solve analytically the differential equations using modified version of the generalized averaging method which has been developed for strongly non-linear problems. We test the validity of these approximate solutions numerically and a good agreement is found for large values of the coefficient of nonlinearity. A transformation is used to write our equations in the form which we can use the multiple-scaling technique. The stability analysis of solutions are studied as an example, and a good agreement is found between the analytical and numerical results.

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