
Stable Positive Bifurcating Equilibria for a System of Damped Wave Equations

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A system of nonlinear damped wave equations with symmetric linear part is investigated. A positive steady-state bifurcates from the trivial solution as a parameter changes. The spectrum of the linearized operator is studied. Then the stability of the positive steady-state is considered as a solution of the nonlinear hyperbolic system. Asymptotic stability results are found for the solutions in bounded domains of dimensions larger than or equal to one. Bifurcation methods are used to prove the existence of positive steady-states, and semigroup methods are used to study stability. Stability results are obtained although the semigroup is not analytic. In applications, the interacting waves can be electromagnetic fields, lasers or various forms of vibrations.