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Editors
Nonlinear Differential Equations and Applications NoDEA

Dear Editors,

Please consider the manuscript entitled "Sharp Energy Decay and Indirect Stabilization for a Nonlinearly Coupled Wave–Diffusion System with Mixed Boundary Conditions" for publication as an Original Paper in *Nonlinear Differential Equations and Applications NoDEA*.

The manuscript studies a semilinear hyperbolic–parabolic system in which dissipation acts only through the diffusion component. The main analytical result identifies the high-frequency obstruction to exponential stabilization and proves a sharp polynomial energy law. More precisely, the mixed-Laplacian modal polynomial yields a wave pair whose real parts are asymptotic to $-\kappa^2/(2\lambda_n)$. We prove a matching quadratic resolvent estimate and, by the Borichev–Tomilov theorem, obtain the optimal energy decay $E(t) = O(t^{-1})$ for strong data. The nonlinear part establishes global finite-energy well-posedness, an exact dissipation identity, asymptotic stabilization, and near-sharp small-data polynomial decay.

We believe the manuscript is aligned with NoDEA's emphasis on rigorous qualitative analysis of nonlinear differential equations, including well-posedness, stability, asymptotic behavior, coupled evolution systems, and mixed boundary-value problems. The numerical material is deliberately limited to a reproducibility check and is not used as evidence for the theorems.

This manuscript is original, has not been published previously, and is not under consideration elsewhere. The author declares no conflict of interest and no external funding. No external data were used.

Thank you for your consideration.

Sincerely,

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