Research

Analysis Seminar

Long-time dynamics for a fractional piezoelectric system with magnetic effects and Fourier's law

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Date: March 19th, 2021

Time: 10:00 am

On-line at:

Abstract. In this work, we use a variational approach to model vibrations on a piezoelectric beam with fractional damping depending on a parameter $\nu \in (0, 1/2)$. Magnetic and thermal effects are taken into account via the Maxwell's equations and Fourier law, respectively. Existence and uniqueness of solutions of the system is proved by the semigroup theory. The existence of smooth global attractors with finite fractal dimension and the existence of exponential attractors for the associated dynamical system are proved. Finally, the upper-semicontinuity of global attractors as $\nu \to 0^+$ is shown.

References

[1] I. Chueshov, I. Lasiecka, Von Karman Evolution Equations. Well-posedness and Long Time Dynamics, Springer Monographs in Mathematics, Springer, New York, 2010.

[2] M. M. Freitas, A. J. A. Ramos, A. Ö. Özer, D. S. Almeida Júnior, Long-time dynamics for a fractional piezoelectric system with magnetic effects and Fourier's law, J. Differential Equations, 280 (2021) 891–927.