

Functional Analysis and Mathematical Physics

Interdepartmental Research Group

(FAMP)

Colloquium Series

Fall 2020

Talk 7: *Spectral Bounds for Damped Systems*

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Abstract

We consider a second-order differential equation

$$z'(t) + Dz'(t) + A_0z(t) = 0$$

in a Hilbert space X with linear operators D and A_0 , which can be rewritten as a first-order evolution equation

$$y'(t) = \begin{bmatrix} 0 & I \\ -A_0 & -D \end{bmatrix} y(t)$$

in the product space $X \times X$, with the matrix operator being a generator of a C_0 -semigroup.

The growth bound of the semigroup is difficult to estimate. However, under certain assumptions, we are able to furnish bounds for the spectrum of the generator. In particular, we succeed in establishing the existence of a spectral gap which is the first result of this kind since the seminal results of Krein and Langer for oscillations of damped systems. While the latter and other spectral bounds are confined to the damping coefficient D that is symmetric and dominated by A_0 , we allow an accretive D of equal strength with A_0 .

This is a joint work with J. Jacob (Wuppertal, Germany), C. Tretter (Bern, Switzerland), and H. Vogt (Bremen, Germany).

Friday, October 30, 11:00 AM - 12:00 PM (PDT)

Online via Zoom at

<https://fresnostate.zoom.us/j/5233106532>