

Analyticity and exponential stability of multilayered beam systems

Abstract: The classical sandwich beam consists of two relatively stiff "face plates" and a viscoelastic central core layer, that usually is designed to absorb vibrations in the composite structure. Two well-known sandwich beam models are the Mead-Markus model and the Rao-Nakra model. In this talk we consider multilayer versions of each and describe the "best" and "worst" damping arrangements in the layers. In the case of the Mead-Markus model the associated semigroup can be shown to be analytic. We obtain explicitly the optimal damping levels that maximize the angle of analyticity. In the case of the Rao-Nakra model analyticity does not hold (this is due to inclusion of the rotational moment of inertia in the model) but in many cases exponential stability can be proved. I will describe necessary and sufficient conditions, in terms of wave speeds of each layer for exponential stability to hold.

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