

TIME DELAY SYSTEMS

Webinar

TDS

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Stability lines of delayed boundary feedback control of rods



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7:00 am (PDT), 10:00 am (EDT), 10:00 pm (CST)

Event will take place via Zoom

ABSTRACT: The longitudinal vibration stability of elastic rods under delayed boundary feedback is presented analytically, with emphasis on the structure and evolution of stability patterns in the parameter plane. For the undamped controlled rod, exponential stability exists only on isolated, zero-measure vertical lines when the delay ratio (feedback delay over wave travel time) is an odd integer. The introduction of an attached lumped mass (inertial effect) triggers a sudden stability switch: as the inertia ratio increases, new zero-measure stability lines 'sprout' from previously unstable regions. The undamped system is only asymptotically stable (not exponentially), while internal damping expands these lines into finite stable domains.

BIO: Li Zhang received the B.S. degree in Aircraft Design in 2004 and the PhD degree in Dynamics and Control in 2012 from Nanjing University of Aeronautics and Astronautics (NUAA), Nanjing, China. She is a professor at the College of Aerospace Engineering and is currently deputy director of Center for Dynamics of Intelligent Equipment at NUAA. Her research interests include nonlinear dynamics, as well as dynamics and control of time-delay systems, with applications to human balancing and large-scale space structures.



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