

Abstract Submitted
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Experimental Measurements and Analysis of the Effects of Damping on Circular Drums¹ WILLIAM MIYAHIRA, None — When a drum is struck, its vibration can be characterized as a linear combination of vibrational modes. These modes are comprised of a number of nodal lines and circles (m,n) where the drum does not vibrate. Each mode has a different decay time, with some of the higher frequency modes ringing out longer than others. Many drummers choose to get rid of this ringing by placing commercially sold gels on the perimeter of the drum. This research looked to develop a method of measuring the decay time of each mode when the drum is struck, and how the addition of the gel affected those measurements. Using an electronic speckle-pattern interferometer optical laser setup along with waterfall data measurements from a spectrum analyzer, I was able to determine the relative decay rates of the modes present when a drum is struck. From these measurements, it was found that the (3,1), (4,1), and (5,1) modes tended to ring out. When a gel was placed on the drum, it was found that the overall decay time of the drum was decreased by over one second, with the most significant changes being found in the (3,1), (4,1), and (5,1) modes. The gel was observed to act as a viscoelastic material, so that some of the energy in the vibration is lost to heat, which causes the decay rates of the modes to increase. In the future, one could use similar techniques to observe other dampening materials, or observe drums with two heads.

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