

Abstract Submitted  
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**Synchronization of Coupled Mechanical Oscillators**<sup>1</sup> LINDA KENNEDY, Columbus Public Schools, BARBARA ANDERECK, Ohio Wesleyan University — The Kuramoto model is used to describe synchronization of non-linear oscillators in biological, chemical, and physics systems. Using identical metronomes with similar frequencies on a movable platform, as per J. Pantaleone *Am. J. Phys.* **70**, 992 (2002), we hope to realize a mechanical example of this model. A variety of materials were used for the movable platforms that coupled the metronomes. Platforms were either allowed to roll on cylindrical supports or suspended in pendulum fashion from the ceiling. Metronomes were started out of phase and allowed to synchronize. Measurements by PASCO photogates monitored by a LabView program were used to determine the phase difference between the two metronomes as a function of time. The dynamics of the metronome coupling was described by two second-order differential equations involving four key parameters: platform coupling, oscillation angle, damping/driving strength, and intrinsic frequency difference. Outstanding agreement between theory and experiment was achieved when the vertical motion of the platform and metronomes was included in the governing equations.

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