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**Synchronization of Metronomes and Moons**[1] BARBARA ANDERECK, Ohio Wesleyan University, ANNE BENJAMIN, Wellesley College, DAVID CARPENTER, Hayes High School — When (nearly) identical non-linear oscillators are coupled they can adjust their frequencies and settle into synchronous motion. The path to synchronization exhibits interesting and sometimes intricate oscillations of its own. We have studied the nature of this path for two systems: mechanical oscillators in the form of identical metronomes and orbiting satellites, specifically Io and Europa, the two inner Galilean satellites of Jupiter. We report the basic behaviors observed and dependence of key parameters of these behaviors on physical properties of the system and initial conditions.

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