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A Simple Kuramoto-like Circuit[1] ZHUWEI ZENG, DAVID MERTENS, Dickinson College — The toy model for spontaneous collective synchronization is the Kuramoto model, a model of nonlinear coupled phase oscillators. Although it is a popular theoretical tool, the Kuramoto model is too simple to accurately characterize the dynamics of any experimental collection of oscillators. In this talk, we present a simple electronic oscillator design similar to the Wien bridge design of Temirbayev et al. Although the oscillator is not strictly modeled by the Kuramoto model, it can be quantitatively modeled by a more generic phase oscillator model. The coefficients governing the oscillator's behavior can be directly extracted from the voltage time series of the oscillator. We find that, in practice, only a handful of coefficients are necessary to quantitatively describe the behavior of the oscillators, making precise theory tractable.

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