Synchronization in growing populations of coupled oscillators and excitable elements WEN YU, Graduate Student Research Assistant, Univ of Michigan - Ann Arbor, KEVIN WOOD, Assistant Professor, Univ of Michigan - Ann Arbor — In biological systems, synchronized dynamics often exist in growing populations. We show here that population growth can have significant effects on collective synchronization in discrete phase models of coupled oscillators or excitable elements. Using numerical simulations, mean field theory, and linear stability analysis, we demonstrate that coupling between population growth and synchrony can lead to a wide range of dynamical behavior, including extinction of synchronized oscillations, the emergence of asynchronous states with unequal state (phase) distributions, bistability between oscillatory and asynchronous states or between two asynchronous states, and modulation of the frequency of bulk oscillations.

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