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Topological Influence On Network Of Coupled Chemical Oscillators JIE ZHAO, ERIN RERICHA, Vanderbilt University, VANDERBILT BIOPHYSICS COLLABORATION — Networks of interacting nodes are ubiquitous in biological and communication systems. Recently the manner of the network connections, be it through of activator or inhibitor signals, and the topology of the network has received theoretical attention with the goal of finding networks with optimal synchronization and information transmission properties. In preparation for building an experimental system to examine these predictions, we numerically explore networks of Belousov-Zhabotinsky oscillatory nodes connected through unidirectional links of activator species. We measure the time required for the nodes to synchronize as a function of the network topology. While we observe a trend of smaller synchronization times with increasing first non-zero eigen values, we find that the most important factor in determining synchronization time is the initial phase difference between the oscillators. We find that the synchronization times for a given network topology, as determined from a uniform distribution of initial phase differences, is best described with a skewed Gaussian. To better understand the factors underlying this distribution, we look at the synchronization times in a three-node network as a function of both initial conditions and model parameters.

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