SIGEST

Over the last fifteen years, *SIAM Review* has published a range of articles in the general area of network science, reflecting a growing interest in this field across the applied and computational mathematics community. Time-dependency is often a key component of recent studies. We can look at the evolution of network structures (dynamics of networks) or the evolution of processes defined on a network structure (dynamics on networks). The SIGEST article in this issue, "Center Manifolds of Coupled Cell Networks," by Eddie Nijholt, Bob Rink, and Jan Sanders, deals with the second of these issues. The authors consider ODEs where the rate of change of the state of each node depends on the current state of its neighbors. They focus on solutions that exhibit *synchronization*. Here each node has evolved to the same value—for example, representing consensus in the case where the ODE models the spread of opinions. Their aim is to understand what types of solution emerge when synchrony breaks down as a result of a model parameter being varied. Such bifurcation analysis, when applied to network classes typically encountered in practice, is not amenable to the usual tools of dynamical systems theory.

The original article appeared in the *SIAM Journal on Mathematical Analysis* in 2017. In order to make the work more accessible to SIREV's wide readership, this SIGEST version contains additional motivation and a longer introduction.

At the heart of the article is an ingenious embedding technique for identifying hidden structures in coupled systems. The authors show how any network can be extended into a larger network that possesses a semigroup symmetry. A center manifold reduction then allows local bifurcations to be studied systematically. The analysis is illustrated on three example networks that support a rich variety of behaviors. This is a technically ambitious and timely piece of work that will be of particular interest to readers who perform analysis in network science or dynamical systems, or who study network-based dynamics in applications from neuroscience and animal behavior to power systems.

The Editors