

Get in synch -- or be enslaved by it

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We talk about synchronization a lot. We synch up; synch our computers; and get in synch. And synchronous behavior underlies many natural systems, events and phenomena.

Understanding conditions that cause oscillators -- which are common electronic components that produce a repetitive electronic signal -- to get in synch or fall out of synch, is necessary to achieve the optimal functioning of oscillator networks that underlie many technologies. The transition from [synchronization](#) to desynchronization is the subject of a new investigation by a team of Japanese scientists. Their report appears in the journal [CHAOS](#), which is published by the American Institute of Physics.

"On one hand, synchronization is necessary for communication and [information processing](#). On the other hand, synchronization can blow violently out of proportion and enslave everything it is in contact with," explains Ralf Toenjes of Ochanomizu University. He and his colleagues show that adding only a few links to a network can have such a strong effect that even this modest addition can mark the difference between random noise and coherent synchronization. They devised a method of control that enables them to balance the system at states that are actually unstable and usually not observed.

More information: The article, "Synchronization Transition of Identical Phase Oscillators in a Directed Small-World Network" by Ralf Toenjes (Ochanomizu University), Naoki Masuda (The University of Tokyo) and Hiroshi Kori (Ochanomizu University) appears in the

journal *CHAOS*. link.aip.org/link/CHAOEH/v20/i3/p033108/s1

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