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**Synchronization of coupled oscillators in the presence of noise and communication delays** LUC ROBICHAUD, ALAIN HACHE, Universite de Moncton — The Kuramoto model of coupled oscillators has been shown to describe many collective phenomena such as synchronization in natural and artificial systems. There are many factors that determine whether a system can synchronize or not, including the coupling strength, the number and density of oscillators and their natural frequencies. In some cases, however, noise and communication delays must also be taken into account, as they can significantly limit a system's capacity to synchronize. In this work, we map the space of parameters where synchronization of an ensemble of oscillators is possible when noise and delays are present. Based on numerical results, we derive general conditions to predict the possible synchronization of any given system. The possibility and limits of using a single quantity to predict synchronization, the "quality of information", which is related only to noise and delay, is discussed.

Alain Hache
Universite de Moncton