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Phase synchronization induced by common external telegraphic noise KEN NAGAI, Kyoto University — Generally, noise desynchronizes phase of nonlinear oscillators. However, when a neuron receives a randomly fluctuating input current, its reliability of spike generation improves compared with the case of a constant input current [Mainen and Sejnowski, Science **268**, 1503 (1995)]. Like this phenomenon, phase synchronization between uncoupled nonlinear oscillators subject to a common external noise occurs in some systems. Phase synchronization between uncoupled limit-cycle oscillators is induced by common external telegraphic noise that jumps between two values randomly [Nagai and Nakao, Phys. Rev. E, **71**, 036217 (2005)]. We observed this phenomenon with an electric circuit and analyzed it. When the switching time of the input current is sufficiently long, the internal state of the oscillator randomly jumps between two limit cycles corresponding to the input values, which can be described by random phase maps. We determined the phase maps experimentally and discussed the synchronization of oscillators subject to fluctuating inputs, using this maps. The Lyapunov exponents of the maps corresponded to damping rate of the variance of the phase.

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