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Connectivity-disorder effect on collective synchronization JAEGON UM, School of Physics, Korea Institute for Advanced Study, Seoul 130-722, Korea, HYUNSUK HONG, Department of Physics, Chonbuk National University, Jeonju 561-756, Korea, HYUNGGYU PARK, School of Physics, Korea Institute for Advanced Study, Seoul 130-722, Korea — We investigate a system of random frequency oscillators coupled through sparse random networks and explore connectivity-disorder effects on collective synchronization. In particular, we pay attention to how the random quenched disorder in connectivity affects the nature of synchronization transitions. The oscillator frequencies are assigned independently from an unimodal, bimodal, or uniform distribution. Extensive numerical simulations as well as the mean-field analysis have been performed on Erdös-Rényi random networks. We find that the quenched connectivity disorder invalidates the mean-field prediction of distinctive transition natures depending on frequency distributions in random networks. In fact, the same continuous synchronization transition is found for all types of frequency distributions. The physical origin of this unexpected result is discussed.

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