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Sync-map Description of Coupled Oscillators GILAD BARLEV, Kenyon College, EDWARD OTT, MICHELLE GIRVAN, University of Maryland, College Park — The Kuramoto model describes the tendency of coupled oscillators to synchronize when the coupling strength is above a critical value. Through Monte Carlo simulations, we study the behavior of a variation on the discrete-time Kuramoto model and verify certain properties of the model, namely the critical coupling value and the rate of relaxation towards synchronization. We then apply the model to non-directed networks with community structure to investigate synchronization within communities. Further, we propose a method for the discovery of community structure within networks based on observations of the time-averaged degree of synchronism between pairs of oscillators within our system.

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