Time-Shifts and Correlations in Synchronized Chaos JONATHAN BLAKELY, NED CORRON, US Army RDECOM — We introduce a new method for predicting characteristics of the synchronized state achieved by a wide class of uni-directional coupling schemes. Specifically, we derive a transfer function from the coupling model that provides estimates of the correlation between the drive and response waveforms, and of the time shift (i.e., lag or anticipation) of the synchronized state. Notably, this approach does not require modeling or simulation of the full coupled system. To demonstrate the method, we compare its predictions to simulations of a variety of different coupled oscillator systems as well as to an experimental system of coupled chaotic electronic circuits. Finally, we show that the transfer function can be exploited to design novel coupling schemes that significantly improve the correlation and increase the maximum achievable time shift.

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