

# Investigation of Two Coupled Maps with Delay Coupling

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## SUMMARY

Generally, complex dynamical phenomena can be observed in networks formed by many elements with nonlinearity. Coupled Map Lattice (CML) has proposed by Kaneko [1]-[4], to represent the complex high-dimensional dynamics, for example biological systems, networks in DNA, economic activities and neural networks. Furthermore, we focus on intermittency chaos and delay.

The delay naturally occurs from information transmission and processing speeds in the realistic networks[5]. In Ref.[5], the synchronization states of the coupled logistic maps are affected by the delay. Namely, the synchronization state of coupled chaotic maps are induced by the delay. Therefore, the studies considered the delay in coupled chaotic maps are investigated actively. In addition, intermittency chaos has stability and mobility and gains good result for information processing. We consider that intermittency chaos is related to various phenomena[6][7], e.g, information processing of the brain. In order to make clear the mechanism of such phenomena in various fields, unveiling the roles of intermittency chaos is very important.

In this study, we focus on the influence of the delay in two coupled cubic maps with intermittency chaos. When we set a control parameter of two cubic maps to generate intermittency chaos near the six periodic window, various synchronization states are confirmed in laminar part. First, we investigated the relation between average length of laminar part and the delay. Second, we confirmed change of synchronization pattern by the delay.

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