

## Global Analysis of Synchronization using Invariant Measure

Contributed  
Talk

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Synchronization in coupled nonlinear systems is usually studied by linear stability analysis of the synchronized state. This being a local analysis may not always yield correct results. The global analysis uses the Lyapunov function method. But one needs to guess the Lyapunov function and hence this approach is not algorithmic. In [1] we have introduced another method where we used the support of the invariant measure to calculate the critical coupling constant at which the synchronization transition takes place. In this work we considered two coupled tent maps, globally coupled  $N$  tent maps and also some variations in coupling topology. We also studied the complete invariant measure for two coupled tent maps and found that it has multifractal nature [2, 3]. The question was if the multifractal nature changed with the coupling parameter and if the transition to synchronization was encoded in the nature of the multifractal spectrum. The answer was surprisingly negative. The multifractal nature did not change with the coupling parameter. This led to further interesting questions as to what decides the nature of the multi-fractal spectrum. These investigations are in progress. We have tried changing the map. The logistic maps also yields the same shape though there is a shift in the spectrum [4]. The effect of coupling function and topology is being investigated.

### References

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