

Reduced Lattices of Synchrony Subspaces and their Indices

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Various synchronous behaviours, from full synchrony to partial synchrony, can be observed for a given network. We use the coupled cell network formalism to study all possible partial synchronies, which are determined solely by network structure and termed synchrony subspaces of the network. We consider a regular network where identical individual dynamical systems (cells) are coupled with only one type of interaction. All possible synchrony subspaces have a hierarchy structure, which can be represented as a complete lattice. We assign integer tuples with synchrony subspaces, and use them for identifying equivalent synchrony subspaces to be merged. Such a reduced lattice of synchrony subspaces affords a well-defined non-negative integer index that leads to synchrony-breaking bifurcation analysis of regular networks.