Bifurcations of mutually coupled equations in random graphs

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Resumo

We study the behaviour of solutions of mutually coupled equations in heterogeneous random graphs. Starting from a situation where the dynamics of the isolated equations is unstable, we couple them in a heterogeneous random structure. Heterogeneity means that some equations receive many inputs whereas most of the equations are given only with a few connections. We prove that, for almost every random network, such an interaction leads to the appearance of stable subspaces of solutions. Moreover, for certain classes of heterogeneous network, increasing the strength of interaction is shown to correspond to a cascade of bifurcations, in which the dimension of the stable subspace of solutions increases in a way determined explicitly in terms of the graph structure. This is a joint work with Tiago Pereira (Imperial College).