

Dynamics in Heterogeneous Networks: Emergence at Various Scales

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Recent results reveal that typical real-world networks have various levels of connectivity. These networks exhibit emergent behaviour at various levels. Striking examples are found in the brain, where synchronisation between highly connected neurons coordinate and shape the network development. These phenomena remain a major challenge. I will discuss a probabilistic dimension reduction principle to describe the network dynamics. I show that, at large levels of connectivity, the high-dimensional network dynamics can be reduced to a few macroscopic equations. The strategy is to describe ensembles of random networks, and the dynamics almost every initial state. This reduction provides the opportunity to explore the coherent properties at various network connectivity scales.

This is a joint work with Sebastian van Strien and Jeroen Lamb.