明治大学先端数理科学インスティテュート

MIMS現象数理カフェセミナー

日時：2022年6月8日（水）（12:40 – 13:20）

場所：Zoomオンライン開催

Reservoir computing and its universality

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Abstract： Reservoir computing (RC) is one of the learning methods of recurrent neural networks (RNNs). Unlike general RNNs, it only learns the readout map to reduce the learning cost, but it can still be available for various tasks. Moreover, RC can emulate a dynamical system, which has recently been used for data-driven modelling. The performance of RC relies on the interaction between reservoir nodes. So the dynamics of a random network have been intensively investigated in terms of statistical physics. In this talk, we show some universality corresponding to RC. We have newly discovered that the behaviour of the random network in the thermodynamic limit can be classified according to the probability distribution that the components of the adjacency matrix follow. Furthermore, it is universally observed that the generalisation performance is high near the triple point of the phase diagram. Interestingly, this result shows a different aspect from the so-called edge-of-chaos. This is a joint work with Junichi Haruna and Riki Toshio (Kyoto University).

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