

Joanna Toruniewska, Krzysztof Suchecki, Janusz Holyst

Co-evolution of Potts model and network topology

The co-evolution of the Potts dynamics and topology of the network has been researched. Two models were taken under consideration. The first was the Potts model described by the canonical ensemble, with network dynamics leading to separation of vertices with different states. The second was also the Potts model, but with network dynamics also resulting from the canonical ensemble. The dynamics of connections in the second model does not always lead to network ordering.

Based on the analysis of the obtained results 3 phases have been found: an ordered phase characterized by high global measure of order and small number of interfaces; an ordered clusters phase characterized by low global measure of order and small number of interfaces and a disordered phase characterized by low measure of order and many interfaces.

It was also observed that a change of network density does not influence qualitatively the behavior of the system and all 3 phases behave qualitatively the same, only with a shift of the critical temperature. Observed results are in accordance with predictions based on earlier papers.