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Order Parameters for Emergence of Consciousness?

Haiping Huang

School of Physics, Sun Yat-sen University, P. R. China

Email: huanghp7@mail.sysu.edu.cn

Most non-equilibrium dynamics are not driven by a gradient of potential, and thus properties of steady states can not be analytically packed into an explicit function like a Boltzmann distribution. Here, we take a new angle that only slow points in phase space are considered, and an optimization-based equilibrium measure can thus be constructed. Our theory reveals the continuous nature of chaos transition in a neural network model, and further identifies a response order parameter peaked at the transition, surprisingly consistent with cortical observation of conscious brain states. Our framework thus opens a new route to analyze non-equilibrium steady states.

Reference:

[1] Junbin Qiu and Haiping Huang, arXiv:2401.10009 (2024).