A Noncomputational Strategy Modulating Biological Rhythms

Speaker: Zhaoyue Zhong (Fudan University)

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Abstract: In this talk, we introduce a mathematically rigorous control strategy for the concurrent modulation of amplitude and frequency in nonlinear dynamic systems, with a focus on oscillatory signals. The central challenge is the independent adjustment of one parameter while constraining the other, a problem of theoretical importance across various complex systems. By leveraging system nonlinearity, we decouple these parameters using a noncomputational approach. This method, supported by a robust mathematical framework, has been validated in representative biophysical systems, demonstrating its potential for future applications in controlling oscillatory dynamics across a wider range of complex systems.