Research

Colloquium

Phase-Locked Solutions of Coupled Oscillators

主講人：陳冠維　博士

國家理論科學研究中心

時　間：113 年 05 月 01 日 (三) 14：30

地　點：應用數學系多媒體教室(理 408 室)

摘　要：

We consider a simple example of two Stuart-Landau oscillators under diffusive coupling. By examining the degenerate Routh-Hurwitz criterion for Hopf bifurcation, we confirm the presence of periodic solutions in the coupled system. To further explore the oscillatory dynamics, we transform the coupled system in polar coordinates and perform a mathematical investigation on the existence of phase-locked solutions, which comprise both amplitude components and the phase components. This leads us to demonstrate various oscillatory scenarios in several parameter ranges. Stability or instability of the phased-locked solutions is justified in some cases. In the case of symmetric coupling, strong coupling is necessary for stable phase-locking. However, with asymmetric coupling, stable phase-locking now becomes possible for arbitrarily weak coupling. Moreover, we also address the relationships between the findings from the Hopf bifurcation theory and those from the polar-coordinate setting.