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F-1(초)

Wavelet을 이용한 시계열 분석 김상락(경기대) Wavelet과 Wavelet 변환에 대해 소개하고, Wavelet 변환을 이용한 시계열 분석 방법에 대해 살펴본다. 최근 Wavelet 변환은 Fourier 변환의 하나의 대안으로 크게 관심을 끌고 있다. 우리는 여기서 Fourier 변환으로서는 알아낼 수 없는 시계열이 가진 특성을 알아내거나, 시계열이 가지고 있는 잡음을 줄이는 것에 대해 알아본다.

F-2(초)

Synchronization of diffusively coupled oscillators near the homoclinic bifurcation D. Postnov (Saratov State University, Russia), 한승기(충북대), 국형태(경원대) It has been known that a diffusive coupling between two limit cycle oscillations typically leads to the inphase synchronization and also that it is the only stable state in the weak coupling limit. Recently, however, it has been shown that the coupling of the same nature can result in a different synchronization behavior when the limit cycles are close to the homoclinic bifurcation, which often occurs especially for the neuronal oscillators. In this paper we propose a generic physical model by modifying the van der Pol equation with which one may readily observe changes in the synchronization behaviors between the distinctive regimes. The dephasing mechanism for the latter case is analysed both qualitatively and quantitatively in the weak coupling limit. A general form of coupling is introduced and the synchronization behavior over a wide range of the coupling parameters is explored to construct the phase diagram using the bifurcation analysis.

F-3(초)

Critical behavior of period doublings in coupled inverted pendulums

Sang-Yoon Kim (Kangwon National University) and Bambi Hu (Hong Kong Baptist University) We study the critical behaviors of period doublings in N ($N = 2, 3, 4, \dots$) coupled inverted pendulums by varying the driving amplitude A and the coupling strength c . It is found that the critical behaviors depend on

the range of coupling interaction. In the extreme long-range case of global coupling, in which each inverted pendulum is coupled to all the other ones with equal strength, the zero-coupling critical point and an infinity of critical line segments constitute the same critical set in the $A - c$ plane, independently of N . However, for any other nonglobal-coupling cases of shorter-range couplings, the structure of the critical set becomes different from that for the global-coupling case, because of a significant change in the stability diagram of periodic orbits born via period doublings. The critical scaling behaviors on the critical set are also found to be the same as those for the abstract system of the coupled one-dimensional maps.

F-4(초)

Lyapunov instability of rigid diatomic molecules via diatomic potential molecular dynamics 금오연 (국방과학 연구소), 신영한, 이억균 (한국과학 기술원) We develop a molecular dynamic method with diatomic potential to evaluate the full Lyapunov spectrum for two-dimensional fluids composed of rigid diatomic molecules. The Lyapunov spectra are obtained for 18 rigid diatomic molecules for various bond lengths d ($10^{-3} \leq d \leq 1.0$) in two-dimensions with periodic boundary conditions, and interacting with Hoover and Weeks-Chandler-Anderson short range repulsive forces. The general trends and characteristic features of the Lyapunov spectra are examined for both potentials. Our results are compared with those obtained from I. Borzák *et al.* [Phys. Rev. E **53**, 3694 (1966)], whose model uses the Lagrange multiplier method.

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F-5(초)

Nonequilibrium roughening transition by q-state Potts particles Byungnam Kahng and Sangsoo Park (Kon-Kuk University) We introduce an interface growth model exhibiting a nonequilibrium roughening transition (NRT) from a smooth phase