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1992)의 4차 Runge-Kutta방법을 적용한 덧셈인가 추계 적분기(stochastic integrator)를 이용하여 전산시뮬을 하였다. Markov condition을 만족할 때까지의 과도시간 t_r 내에 있어서($0 < t < t_r$), 추계변수 x 의 분포 $P(x = t)$ 및 moments $\langle x^n \rangle$ 가 색깔잡음의 상관시간, 크기에 따라 변화함을 고찰했다. 과도시간 이후의 P 의 편차는 오차 허용범위내에서 변화가 없었고 잡음의 상관시간이 커짐에 따라 과도시간의 구간이 짧아졌다. 또한 상관시간이 커짐에 따라 P 가 unimodal에서 bimodal로 변화함을 확인하였다.

F-P025

Frequency change in calcium oscillation under the paired pulses of stimulation in astrocytes 김민영, 김승환(포항공대 물리학과) The astrocytes, one type of glial cells, show a rich variety of spatio-temporal patterns in calcium concentration dynamics, which might serve as a long range signaling pathway. Recently, the long-lasting change in Ca^{2+} oscillations after repetitive episodes of stimulation with the glutamate, a typical excitatory neurotransmitter, was observed in hippocampal astrocytes. In this work, we introduce a simplified biophysical model for Ca^{2+} oscillations based on the self-amplified release of Ca^{2+} from intracellular stores. Our model incorporates slow-time dynamics of the IP_3 formation by the agonist-activated glutamate receptor(GluR), assuming that IP_3 synthesis consists of the agonist concentration dependent part and the time dependent part. We find that the frequency of the Ca^{2+} oscillations after paired pulse of glutamate stimulation increases significantly, which is consistent with experimental findings. We discuss implications of our results to the cellular memory function of astrocytes.

F-P026

Dynamics of randomly coupled maps 한용진(순천향대학 물리학과) We study numerically the randomly coupled map(RCM) lattice which evolves in a way that each element selects randomly the other elements to interact. We

find that the system approaches well to full synchronization for various number of selected elements. The structure of formation of full synchronization state is studied compared with Kaneco's global coupled map(GCM) lattice.

F-P027

Riddling Transition in Unidirectionally Coupled Systems 김상운, 임우창(강원대) We study riddling transition, through which the basin of attraction (BA) for the chaotic attractor (CA) on the invariant line becomes riddled with "tongues" belonging to the BA of another attractor, in unidirectionally coupled systems without symmetry. Such riddling occurs via the transcritical transverse contact bifurcation between the saddle fixed point on the boundary of the CA and the repelling fixed point on the boundary of its BA. For this case, an "absorbing area," that acts as a trapping bounded vessel, disappears, and then a dense set of "tongues," emanating from the repelling fixed point and its preimages embedded in the CA, appears. Thus, the BA becomes globally riddled. When a parameter mismatch between the subsystems is introduced, superpersistent chaotic transients arise, the life-time of which is analytically derived and also confirmed numerically.

F-P028

군소의 한 bursting pattern 과 신경 세포의 Excitable Model 현남규, 김희숙, 유영훈(제주대학교 물리학과), 한진희, 강봉균(서울대학교 유전공학 연구소) 서울대학교 유전공학 연구소 분자 신경 생물학 연구실에서 관찰된 군소(aplysia) 신경세포의 한 bursting pattern 을 적절한 model을 사용하여 컴퓨터로 이것과 유사하게 시뮬레이션 하였다. 이로부터 여러가지 이온 전류들, activation 과 inactivation gating variable 들의 형태들은 물론 current-voltage curve 등도 그래서 그 mechanism 을 검토하였다.