Prof. Shu-Ming Chang / Department of Applied Mathematics

Scientific Computations, Dynamical Systems

In Scientific Computations, we focus on **Numerical Computations of Nonlinear Schrodinger's Equations** that there are two researching topics in this field: (1) The Ground State and Excited States for the Bose-Einstein Condensates (BECs) (see Fig. 1), (2) Stability Analysis in the Soliton Waves (see Fig. 2). Then in Dynamical Systems, we focus on **Chaotic System and its Applications** that there are also two researching topics in this field: (3) Investigation on Chaotic Behavior, (4) Digital Chaotic Generators in Secure Communication (see Fig. 4).
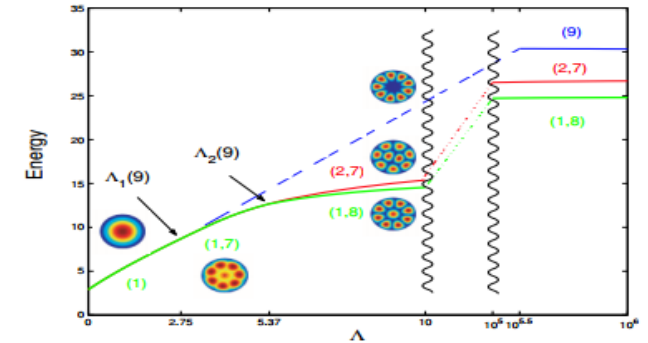

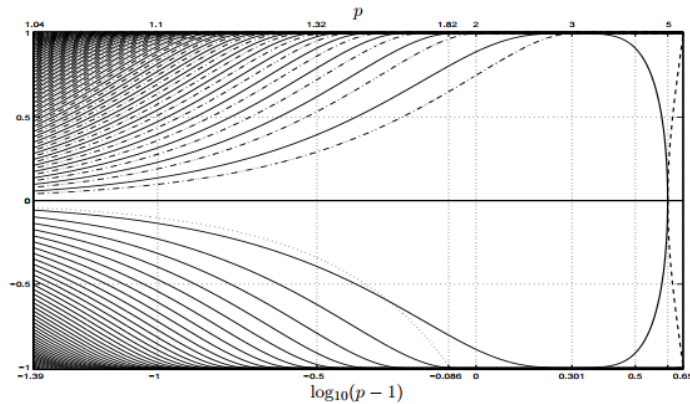Fig. 1. The ground state and excited states of the Nine BECs.

Fig. 2. The soliton wave changes to unstable from stable at the parameter p = 5.
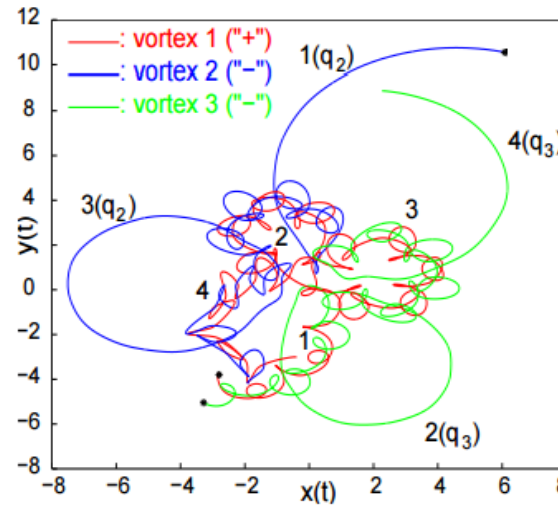

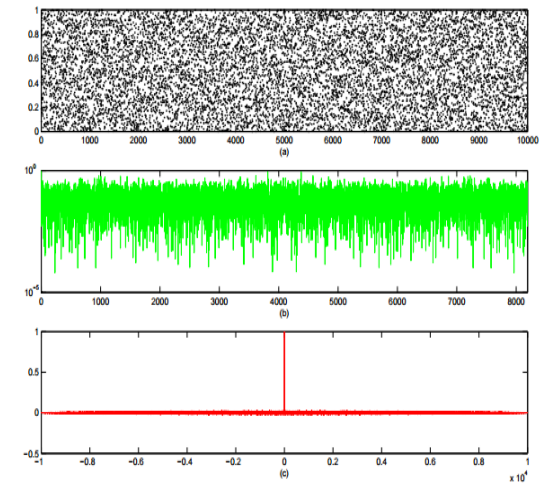Fig. 3. Chaotic behavior for the system with three charge particles.

Fig. 4. (a) Digital chaotic signal.
(b) Spectral analysis in the signal.
(c) Co-relation Analysis in the signal.