Exactly Solvable Chaos and Codes for Communications and Analysis

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Exactly solvable chaos are known to have exact chaotic solutions with explicit ergodic density functions and exact characteristic functions of chaos such as KS entropy and Lyapunov exponents. In this talk, some recent extensions to discrete time and discrete valued dynamical systems developed in cooperation with number theory is introduced with applications to spreading codes for spread spectrum communications which are relevant in a fading environment, Monte Carlo and some optimization computations and a new spectrum analysis based on the Lebesgue spectrum orthogonal functions of those exactly solvable chaos. The code patterns are shown for p=563 at Fig. 1(a) and Fig. 1(b) which represents periodic orbits of exactly solvable chaos with period p-1(=562) and Lyapunov exponents Log (q) respectively, where q are its primitive roots.
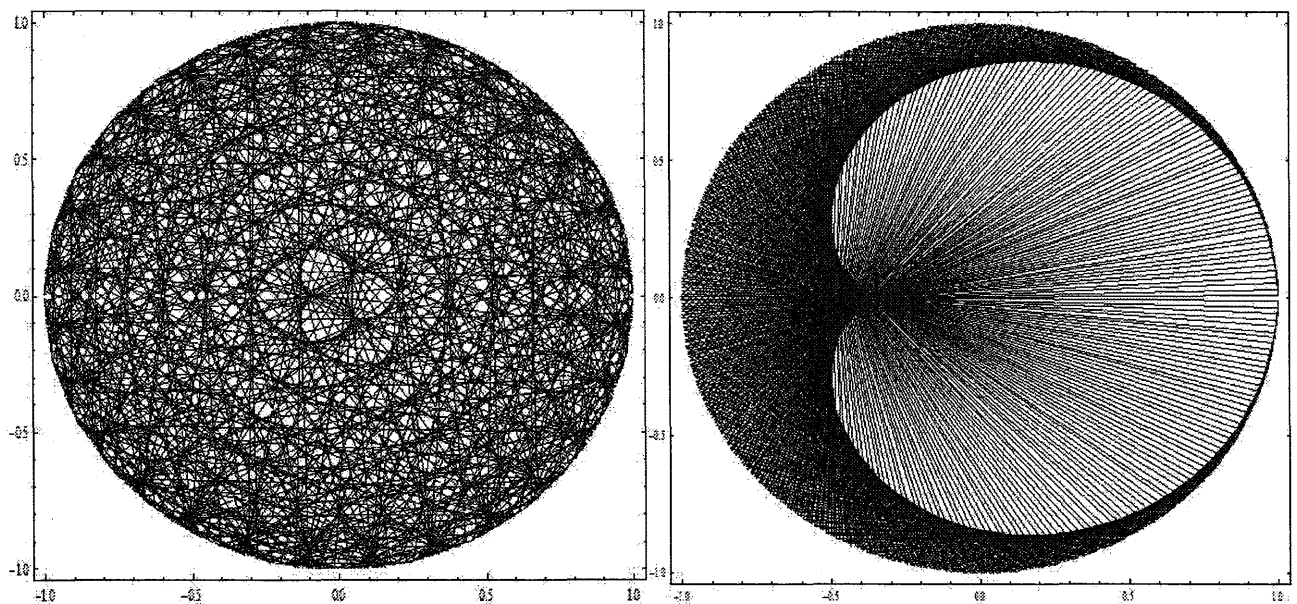

Fig.1 2D Trajectory of Primitive Root Code (Discrete Chaos) for p(prime number)=563 and its primitive roots q=29(a) and 2(b)(right).

References

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