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Probability densities for the sums of iterates of the sine-circle map in the vicinity of the quasi-periodic edge of chaos

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We investigate the probability density of rescaled sum of iterates of sine-circle map within quasi-periodic route to chaos. When the dynamical system is strongly mixing (i.e., ergodic), standard Central Limit Theorem (CLT) is expected to be valid, but at the edge of chaos where iterates have strong correlations, the standard CLT is not necessarily to be valid anymore. We discuss here the main characteristics of the central limit behavior of deterministic dynamical systems which exhibit quasi-periodic route to chaos. At the golden-mean onset of chaos for the sine-circle map, we numerically verify that the probability density appears to converge to a q-Gaussian with $q<1$ as the golden mean value is approached.

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