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Deterministic Chaos in a System Generator – Piezoceramic Transducer

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Abstract: New models and properties of piezoceramic transducer due to the interaction with the excitation device of limited power-supply are built and investigated in details. The special attention is given to examination of origin and development of the deterministic chaos in this system. It is shown, that a major variety of effects typical for problems of chaotic dynamics is inherent in the system. The presence of several types of chaotic attractors is established and the existence of hyper-chaos is revealed. Various scenarios of passage from the regular regimes to chaotic are explored. Explicitly phase portraits and Poincaré sections and maps of of chaotic attractors are investigated. Their spectral densities and distributions of invariant measures are obtained and explored.

Keywords: *Limited excitation; piezoeffect; chaotic attractor; Lyapunov exponents; Poincaré section and mapping.*

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