Abstracts

Chaotic dynamics in coupled microwave oscillators

R.J. Ram, R. Sporer, H.-R. Blank and R.A. York. "Chaotic dynamics in coupled microwave oscillators." 2000 Transactions on Microwave Theory and Techniques 48.11 (Nov. 2000, Part I [T-MTT] (Mini-Special Issue on RF/Microwave Applications in Medicine)): 1909-1916.

Describes an investigation into possible chaotic behavior in a coupled-oscillator system and the possible control of this behavior for communications. The established mathematical models for these oscillator arrays are demonstrated to exhibit chaos when the coupling strength between oscillators is below the range for phase locking. The complexity and predictability of the array dynamics are analyzed by means of standard dynamical measures such as the Lyapunov exponents, the Kolmogorov-Sinai entropy, and the attractor dimension, the authors show that chaos in these oscillator arrays is low dimensional and well characterized; both necessary conditions for control and possible exploitation of chaos. Finally, the method of occasional proportional feedback is used to stabilize the output from the array while the array is still in the chaotic regime. Possible applications of these chaotic transmitters are also discussed.

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