

Abstracts

Weak Signal Detection by Small-Perturbation Control of Chaotic Orbits

C.M. Glenn and S. Hayes. "Weak Signal Detection by Small-Perturbation Control of Chaotic Orbits." 1996 MTT-S International Microwave Symposium Digest 96.3 (1996 Vol. III [MWSYM]): 1883-1886.

We have developed a method of detecting extremely weak signals using fundamental principles of chaotic dynamics. We calculate the time-dependent coupling of the disturbance signal to the stable and unstable manifolds of the system and derive a relationship between the disturbance and the error on the Poincare surface of section thus relating the disturbance signal to the perturbations needed to control a periodic orbit. We demonstrate the algorithm in a computer model of a chaotic system and discuss its implementation in high-frequency devices.

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