Abstracts

Chaos analysis in a millimeter-wave self-oscillating mixer

Chaotic responses are often experimentally encountered in self-oscillating mixers (SOMs), based on IMPATT diodes. In this letter, a chaotic SOM is analyzed, determining the bifurcation sequence that leads from standard operation to chaotic behavior. This analysis has been carried out as a function of the most influential parameters, encountering several torus doublings, which precede the chaotic response. A technique has been developed in order to predict the initial torus doubling from harmonic balance (HB) simulations. This permits the avoidance of the SOM anomalous behavior at the design stage. Excellent agreement has been found between frequency and time domain simulations, both in good correspondence with experimental results.

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