Abstracts

Phase noise in externally injection-locked oscillator arrays

Heng-Chia Chang, Xudong Cao, M.J. Vaughan, U.K. Mishra and R.A. York. "Phase noise in externally injection-locked oscillator arrays." 1997 Transactions on Microwave Theory and Techniques 45.11 (Nov. 1997 [T-MTT]): 2035-2042.

Previous investigations of noise in mutually synchronized coupled-oscillator systems are extended to include the effects of phase noise introduced by externally injected signals. The analysis is developed for arbitrarily coupled arrays and an arbitrary collection of coherent injected signals, and is illustrated with the specific case of linear chains of nearest neighbor coupled oscillators either globally locked (locking signal applied to each array element) or with the locking signal applied to a single-array element. It is shown that the general behavior is qualitatively similar to a single injection-locked oscillator, with the output noise tracking the injected noise near the carrier, and returning to the free-running array noise far from the carrier, with intermediate behavior significantly influenced by the number of array elements and injection strength. The theory is validated using a five-element GaAs MESFET oscillator array operating at S-band.

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