Abstracts

Oscillator Array Dynamics with Broadband N-Port Coupling Networks

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This paper considers the analysis of an oscillator array with an arbitrary coupling network, described in terms of N-port circuit parameters. A Kurokawa analysis is used to transform the frequency domain network description into a set of equations for the oscillator amplitude and phase dynamics. The results reduce to previous work with "loosely" coupled Van der Pol oscillators, provided that the coupling network satisfies a broadband condition: the Q-factor of the coupling network must be much smaller than that of the oscillator. The theory is verified using a new coupling structure and a six-element patch oscillator array operating at 4 GHz, which produced a 70° scanning range using a phase-shifterless technique.

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