Abstracts

A continuum model of the dynamics of coupled oscillator arrays for phase-shifterless beam scanning

R.J. Pogorzelski, P.F. Maccarini and R.A. York. "A continuum model of the dynamics of coupled oscillator arrays for phase-shifterless beam scanning." 1999 Transactions on Microwave Theory and Techniques 47.4 (Apr. 1999 [T-MTT]): 463-470.

The behavior of arrays of coupled oscillators has been previously studied by computational solution of a set of nonlinear differential equations describing the time dependence of each oscillator in the presence of signals coupled from neighboring oscillators. The equations are sufficiently complicated in that intuitive understanding of the phenomena which arise is exceedingly difficult. We propose a simplified theory of such arrays in which the relative phases of the oscillator signals are represented by a continuous function defined over the array. This function satisfies a linear partial differential equation of diffusion type, which may be solved via the Laplace transform. This theory is used to study the dynamic behavior of a linear array of oscillators, which results when the end oscillators are detuned to achieve the phase distribution required for steering a beam radiated by such an array.

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