Abstracts

Nonuniformly Coupled Microstrip Transversal Filters for Analog Signal Processing

L.A. Hayden and V.K. Tripathi. "Nonuniformly Coupled Microstrip Transversal Filters for Analog Signal Processing." 1991 Transactions on Microwave Theory and Techniques 39.1 (Jan. 1991 [T-MTT]): 47-53.

The Fourier transform relationship between frequency response and impedance profile for single nonuniform transmission lines is used to derive the time-domain step response of single and coupled nonuniform lines. The expression for the step response of a characteristically terminated nonuniformly coupled transmission line structure is shown to correspond to the characteristic impedance profile. By using this relationship any arbitrary step response can be realized by utilizing nonuniformly coupled strip or microstrip lines for possible applications as waveform-shaping networks and chirp filters. A numerical procedure to compute the step response of the nonuniform coupled line four-port is also formulated in terms of frequency-domain parameters of an equivalent cascaded uniform coupled line model with a large number of sections. Sinusoidal and chirp responses are presented as examples that are readily implemented using coupled microstrip structures. Step response of an experimental nonuniformly coupled microstrip structure is presented to validate the theoretical results.

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