Abstracts

Analysis of the Time Response of Nonuniform Multiconductor Transmission Lines with a Method of Equivalent Cascaded Network Chain

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In this paper nonuniform multiconductor transmission lines are considered to be equivalent to a cascaded chain of many multiport subnetworks which are made of short sections of uniform lines. The ABCD matrices of the subnetworks can be obtained by the matrix series expansions of their analytic expressions. As long as the number of the subnetworks is large enough to reflect the line nonuniformity fully, the expansions will converge so fast that a few of low-order series terms will be good approximations. After the overall ABCD matrix of the cascaded network chain is evaluated from that of each subnetwork, the time of response of transmission lines can be analyzed. The lines may have frequency-dependent parameters and arbitrary nonlinear terminals. Furthermore, transmission systems with branches uniform and nonuniform transmission lines can be studied with this method conveniently. The analysis accuracy and efficiency are discussed in detail.

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