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An Efficient Algorithm to Determine the Periodic Steady-State Solutions of Nonlinear Systems
Using Extended Spectral Analysis

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Abstract: A new method for the solution of nonlinear periodic systems was developed. It avoids the time domain calculations of the whole network equations. In the proposed method, by forming the augmented network as linear and nonlinear subnetworks these subnetworks are formulated in complex frequency and time domain respectively. Using spectral analysis the steady-state periodic solution of the whole nonlinear network is reached by an iterative approach. The method can be applied efficiently to weak and strong nonlinear circuits equally well. When we divide the network into a large linear subnetwork and a small nonlinear subnetwork, this method can be applied more efficiently. Solutions depending on the chosen total harmonic numbers converge to the exact solutions.

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