Abstracts

Computer-Aided Synthesis of Lumped Lossy Matching Networks for Monolithic Microwave Integrated Circuits (MMIC's)

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A systematic computer-aided synthesis (CAS) technique of lumped lossy matching networks is presented in this paper. This exact synthesis procedure can take arbitrary finite quality factor Q for each lumped element in the matching network and therefore facilitate the circuit design for monolithic microwave integrated circuits (MMIC's) where the loss of the passive elements is too large to be neglected. The gain-bandwidth limitations of some useful lumped lossy matching networks are discussed in detail and are summarized in a set of gain-bandwidth constraint plots. An interactive computer program LUMSYN is developed to solve this lumped lossy synthesis problem. LUMSYN is a general-purpose CAS program which can be used by microwave circuit designers with limited background in network synthesis to carry out low-noise and power amplifier designs in MMIC's. Finally, a design example of broad-band monolithic microwave low-noise amplifier using a state-of-the-art low-noise submicron gate-length GaAs MESFET is presented to illustrate the computer-aided synthesis of MMIC amplifiers.

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