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Titel des Beitrags: Combined lumped element network and transmission line synthesis for passive microwave structures

Abstract: Compact circuit models of electromagnetic structures are a valuable tool for embedding distributed circuits into complex circuits and systems. However, electromagnetic structures with large internal propagation delay are described by impedance functions with a large number of frequency poles in a given frequency interval and therefore yielding equivalent circuit models with a high number of lumped circuit elements. The number of circuit elements can be reduced considerably if in addition to capacitors, inductors, resistors and ideal transformers also delay lines are included. In this contribution a systematic procedure for the generation of combined lumped element/delay line equivalent circuit models on the basis of numerical data is described. The numerical data are obtained by numerical fullwave modeling of the electromagnetic structure. The simulation results are decomposed into two parts representing a lumped elements model and a delay line model. The extraction of the model parameters is performed by application of the system identification procedure to the scattering transfer function. Examples for the modeling of electromagnetic structures are