EXPLOITING ADMITTANCE FORMALISM IN THE NONLINEAR ANALYSIS

Summary – The fundamental issues and ideas regarding the use of the admittance formalism in the frequency domain analysis of weakly nonlinear circuits are addressed in this paper. We begin with presenting and discussing in detail the time domain basics important for this analysis. These are the constitutive equations of basic nonlinear circuit elements and the Volterra series. The need for distinguishing between the inputoutput and in-network type descriptions for nonlinear circuit elements is pointed out. This topic is illustrated by derivations of the aforementioned description types for some two-terminal nonlinear circuit elements devoted to the use in descriptions of weakly nonlinear networks with a single input port. The notion of nonlinear admittance, introduced in one of the recently published papers, is discussed in the context of the modified nodal formulation. The latter uses the modified admittance matrix. Finally, the restrictions regarding a certain operator introduced in the literature to simplify the calculus are pointed out.