Abstracts

Heterostructure Barrier Varactor Simulation Using an Integrated Hydrodynamic Device/Harmonic-Balance Circuit Analysis Technique

J.R. Jones, S.H. Jones, G.B. Tait and M.F. Zybura. "Heterostructure Barrier Varactor Simulation Using an Integrated Hydrodynamic Device/Harmonic-Balance Circuit Analysis Technique." 1994 Microwave and Guided Wave Letters 4.12 (Dec. 1994 [MGWL]): 411-413.

Accurate and efficient simulations of the large-signal time-dependent behavior of GaAs/AIGaAs Heterostructure Barrier Varactor (HBV) frequency tripler circuits have been obtained. This is accomplished by combining a novel harmonic-balance circuit analysis technique with a physics-based hydrodynamic device simulator. The integrated HBV hydrodynamic device/harmonic-balance circuit simulator allows HBV multiplier circuits to be co-designed from both a device and a circuit point of view. Comparisons are made with the experimental results of Choudhury et al. for GaAs/AIGaAs HBV frequency triplers operating near 200 GHz. These comparisons illustrate the importance of representing active devices with physics-based numerical device models rather than analytical device models based on lumped quasi-static equivalent circuits.

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