Abstracts

Digital signal processing - up to microwave frequencies

P. Asbeck, I. Galton, Keh-Chung Wang, J.F. Jensen, A.K. Oki and C.T.M. Chang. "Digital signal processing - up to microwave frequencies." 2002 Transactions on Microwave Theory and Techniques 50.3 (Mar. 2002 [T-MTT] (50th Anniversary Issue)): 900-909.

Digital logic integrated circuits are advancing toward ever higher speeds of operation. Clock frequencies already exceed 1 GHz in some Si CMOS-based consumer products, and even higher speeds are attainable in specialized technologies, such as those based on GaAs, InP, and SiGe bipolar and field-effect transistors. Digital approaches may be used to carry out a variety of functions important in microwave systems, including signal generation, filtering, and frequency conversion. The digital implementation provides a variety of potential benefits, including lack of sensitivity to aging and component inaccuracies, flexibility, and programmability. The dynamic range and degree of nonlinearity can be specified by design. Signal storage and memory functions are easily accomplished. Single-chip integration of digital and microwave systems are also facilitated. The application of digital techniques in domains previously considered to be analog is an important ongoing technology thrust, which may be expected to accelerate. This paper reviews the prospects of digital techniques for microwave systems, and briefly describes the state-of-technology and future possibilities.

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