Abstracts

Signal Processing by Parametric Interactions in Delay-Line Devices

G.S. Kino, S. Ludvik, H.J. Shaw, W.R. Shreve, J.M. White and D.K. Winslow. "Signal Processing by Parametric Interactions in Delay-Line Devices." 1973 Transactions on Microwave Theory and Techniques 21.4 (Apr. 1973 [T-MTT] (Special Issue on Microwave Acoustic Signal Processing)): 244-255.

A new type of signal-processing device which employs the parametric interaction between surface or volume acoustic waves passing in opposite directions through an acoustic delay line is described. These devices are capable of giving the real-time convolution of two modulated signals, and the time inversion of an arbitrary signal. As one signal acts as the reference for the other, a virtually infinite range of electronically variable signal-processing functions, such as recognition of digital codes, pulse compression of an FM chirp, and the realization of a fast Fourier transform, is possible. Early devices which employed the nonlinearity of the acoustic medium tended to give outputs of the order of 60 dB less than the input signal. Recent developments, in which a semiconductor placed near the piezoelectric medium interacts with the acoustic wave, have yielded results where the loss from input to output is of the order of 30 dB.

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