Abstracts

A Mixer Computer-Aided Design Tool Based in the Time Domain

A time domain based technique for computer-aided mixer analysis and design is presented. The design tool uses SPICE (13) to arrive at the steady state solution for the network equations in the mixer circuit. These non-sinusoidal waveforms are studied to understand the interaction of diode, circuit and drive conditions. Graphically derived criteria are developed to optimize mixer performance. Circuit characteristics such as conversion loss, input and output impedances at every small-signal frequencies are rapidly calculated by using a Fast Hartley Transform (FHT) to generate the Fourier transform of the required waveforms. This technique can be used to analyze mixers that can be described in terms of transmission lines, lumped components or any other element blocks available with SPICE. As MMIC's are frequently designed with lumped components, it is envisaged that this tool could be applied to their design.

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