Double Modulation Scheme for Switching Mixers Controlled by Sigma-Delta Modulators

A new method of modulating a signal, using sigma delta modulation in conjunction with switching- and sub-sampling mixers, is presented. Besides the normal functionality provided by the mixer, an additional mixing or modulation function can be achieved with a small modification to the existing mixer. This modification can be carried out on a large variety of mixers including the above mentioned. Although the principle was meant to be used to down convert analog signals, the principle is general and can be used in digital circuits too. This paper verifies the new mixing scheme and compares it to the traditional mixing scheme. Also the most suitable applications of the different mixing schemes are discussed.