

Abstract

Research Title : A Synthesis and Design of Resistor-less Current-mode Sinusoidal
Quadrature Oscillator

Author : Dr. Supayotin Na Songkla

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This research presents the synthesis and design of a current-mode sinusoidal quadrature oscillator using CCCIs. The features of the proposed oscillator are that: (1) Electronic tunability of oscillation condition and oscillation frequency. (2) High-impedance current outputs. (3) Independent tuning of the oscillation frequency and the oscillation condition. (4) Consisting of merely 3 CCCIs, 1 electronic resistor and 2 grounded capacitors without any floating elements. The proposed circuit is then suitable for IC architecture

The PSpice simulations using the parameters of a 0.25 μ m TSMC CMOS technology with ± 1.5 V voltage supply, $C=200$ pF, $I_{B1}=I_{B2}=100\mu$ A and $I_{B3}=60\mu$ A show that the proposed oscillator can provide 2 sinusoidal signals with 90 degree phase difference. At 1.25MHz of oscillation frequency, the total harmonic distortion (THD) is about 1.24%. Moreover, the experimental results using commercial ICs (AD844) agree well with the theoretical anticipation.

Keywords: sinusoidal oscillator topology, CCCII, Integrator, Current-mode