Abstract

Research Title : A Synthesis and Design of Current-mode Sinusoidal Quadrature Oscillator Using CCCDTA and Its Applications to the Study of Electronic Circuit Design

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The purposes of this research are (1) to synthesize and design an electronic controllable current-mode sinusoidal quadrature oscillator using CCCDTA (2) to analyze and compare the performances of the proposed oscillator obtained from theoretical analysis with PSpice simulation and experimental results. (3) to construct and find the efficiency of an instructional package on the topic of current-mode sinusoidal quadrature oscillator using CCCDTA.

The proposed oscillator is based on current controlled current transconductance amplifier (CCCDTA). The oscillation frequency and oscillation condition can be electronically controlled via input bias currents. The circuit description is very simple, consisting of merely 1 CCCDTA and 2 grounded capacitors. Without any external resistors and using only grounded elements, the proposed circuit is then suitable for IC architecture. Moreover, high output impedances of the configuration enable the circuit to be cascaded without additional current buffers.

The PSpice simulations show that at 590.59kHz of frequency oscillation, the total harmonic distortion (THD) is about 2.94%. The average power consumption is approximately 4.36mW at ±2.5V supply voltages. Moreover, the simulation and experimental results agree well with the theoretical anticipation.

An instructional package is used to transfer new knowledge to concerning person. The samples are 25 students of the second and third year bachelor degree department of electronic technology, faculty of industrial technology, Suan Sunandha

Rajabhat University. The experimental plan of this research is "One Group Pretest-Posttest Design". The scores are computed for its efficiency with the formula E1/E2.

The results show that this instructional package had efficiency at 85.143/80.8 which is higher than 80/80. Moreover, the results obtained from experts for suitability are found that the instructional package is in most suitable level (average value is 4.531). For the impressibility offering from the students to the demonstrative set is in much agree level (average value is 4.199).