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Short communication

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A Novel Highly Linear Square/Triangular Wave Generator with Tunable Duty Cycle

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Abstract: A novel circuit of square/triangular wave generator consists of single multiple output dual-X current conveyor transconductance amplifier (MO-DXCCTA), one grounded resistor and one grounded capacitor is proposed. One square wave in current mode and one triangular wave in voltage mode are simultaneously available from the proposed generator. The proposed circuit is fully electronically controllable facilitating the feature of duty cycle adjustment. The duty cycle is electronically tunable via bias current. Moreover, a wide sweep of oscillation frequency is possible via grounded capacitor with very good linearity. The tuning of oscillation frequency does not affect the amplitudes of output waveforms. Furthermore, the oscillation frequency can also be controlled electronically and independently via bias current for a fixed duty cycle of 50%. A prototype of MO-DXCCTA using commercial ICs (AD844 and LM13700) is used to carry out the experimental results. Measured results show very good variation of frequency (up to 245.5 kHz) against capacitor with nonlinearity less than 2%.

Keywords: Adjustable duty cycle, Electronic tuning, Square wave generator, Triangular wave generator.

1. Introduction

A square /triangular wave generator is used in many applications such as pulse width modulator [1], capacitive and resistive sensors interface [2-3], digital capacitance/impedance measurements [4], modulator circuits [5] etc. In the literature, the circuits of square

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