ABSTRACT

Title of Thesis: Some Investigations into the Design Of Analog Circuits Using Current Differencing Differential Input Transconductance Amplifier.

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Subject/Field of Research: Analog Signal Processing

Department/Faculty/Centre: Electronics & Communication Engineering Department

This dissertation is divided into four categories: Brief introduction of various active building blocks, Voltage-mode all pass filter, SRCO(single resistance controlled oscillator), Current-mode lossy integrator circuits, comprising five chapters.

First chapter discussed the most commonly used different active building blocks used in analog signal processing. It shows the symbolic diagram, CMOS realizations and hybrid matrix of active building blocks. Few of them are CFOA, OTA, VDTA, CDBA, VDBA, CDDITA, CCI, CCII, CCIII, CCTA, CDTA, FTFN and OTRA.

Second chapter deals with voltage-mode first order all pass filter (VM-APF) employing single current differencing differential input transconductance amplifier (CDDITA) as active component is proposed here. The given configuration employs one CDDITA, along with two resistors and one grounded capacitor.

Third chapter implements a novel single resistance controlled oscillator (SRCO) using one modified current differencing differential input transconductance amplifier (MCDDITA), two

resistors, two capacitors and one buffer. This circuit is tested for generating mid frequency of 680 KHz with low resistance of 2KΩ and small capacitances of 0.1nF. So, the circuit is found less bulky.

Fourth chapter implemented the realization of current-mode (CM) lossy integrator that uses one current differencing differential input transconductance amplifier (CDDITA) and one grounded capacitor has been presented. The proposed configuration has an ability to simulate an ideal current-mode integrator under the non-ideal conditions, with electronically adjustable gain. So, the nature of presented circuit remains unaffected even under non-ideal conditions.

Finally, conclusions of this thesis are made in **Chapter 5**, which also suggests some ideas for future research work.