A
Dissertation
On

# STUDY AND IMPLEMENTATION OF DIFFERENTIAL VOLTAGE CURRENT CONTROLLED CONVEYOR TRANSCONDUCTANCE AMPLIFIER BASED FILTERS

Submitted in Partial fulfillment of the requirement
For the award of Degree of

**MASTER OF TECHNOLOGY**
**(VLSI DESIGN & EMBEDDED SYSTEM)**


Submitted By:
**PRAVEEN KUMAR**
University Roll No: 15/VLSI/09

Under the Guidance of:
**Dr. NEETA PANDEY**
(ASSISTANT PROFESSOR)
Department of Electronics & Communication Engineering
Delhi Technological University, Delhi.




**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**
**DELHI TECHNOLOGICAL UNIVERSITY**
**(FORMERLY DELHI COLLEGE OF ENGINEERING)**

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# DELHI TECHNOLOGICAL UNIVERSITY, DELHI

Department of Electronics & Communication Engineering

# CERTIFICATE

This is certified that the dissertation entitled "**Study and Implementation of Differential Voltage Current Controlled Conveyor Transconductance Amplifier based Filters**" is a work of **Praveen Kumar (**University Roll No. 15/VLSI/09), a student of Delhi Technological University. This work was completed under my direct supervision and guidance and forms a part of the Master of Technology (VLSI Design and Embedded System) course and curriculum. He has completed his work with utmost sincerity and diligence.

The work embodied in this major project has not been submitted for the award of any other degree to the best of my knowledge.

**Dr. Neeta Pandey**
Assistant Professor
ECE department
Delhi Technological University
Delhi-110042

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**Praveen Kumar**
(15/VLSI/09)

# ABSTRACT

In this thesis differential voltage current controlled conveyor transconductance amplifier (DVCCCCTA), a current mode building block and its application as higher order voltage mode filter has been studied. The higher order filter may be realized using operational simulation (or leapfrog approach), topological simulation or wave active method. A detailed discussion of wave active method and operational simulation method has been given. The wave method is used for simulating reflected and incident wave for basic building block i.e. series inductor and configuring it for other passive element realization by making appropriate connection. DVCCCTA gives the resistorless realization of wave active filter and leap-frog filter. This structure also possesses electronic tunability of cutoff frequency. A $4^{th}$ order lowpass filters has been realized using DVCCCTA based wave equivalents and its performance is evaluated through SPICE simulations using 0.25µm TSMC CMOS technology parameters.

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