DELHI COLLEGE OF ENGINEERING

DELHI

Department of Electrical Engineering

CERTIFICATE

It is certified that **Mr. UDIT GOEL Roll No. 8460**, student of M.E Electrical Engineering (Control and Instrumentation), Delhi College of Engineering, has submitted the dissertation entitled **"FULLY DIFFERENTIAL ACTIVE BUILDING BLOCKS AND THEIR APPLICATIONS IN SIGNAL PROCESSING"** under my guidance in partial fulfillment of the requirements for the award of the degree of Master of Engineering in Electrical Engineering (Control and Instrumentation). This dissertation is a record of his work carried out by him under my guidance and supervision and has not been presented earlier for the award of any degree / diploma.

Prof. (Dr.) NARENDRA KUMAR
Head of Department
Department of Electrical Engineering
Delhi College of Engineering
Delhi-110042

Dr. PRAGATI KUMAR
Assistant Professor
Department of Electrical Engineering
Delhi College of Engineering
Delhi-110042

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UDIT GOEL
College Roll No. 12/C&I/08
University Roll No: - 8460

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ABSTRACT

In the present dissertation some studies have been carried out on “fully differential active building blocks and their applications in signal processing”.

Traditionally in instrumentation systems various signal processing functions such as amplification of the output of transducers, signal generation, filtering of signals are being performed by active circuit elements like operational amplifiers. The most commonly used operational amplifier is the general purpose internally compensated operational amplifier of the 741 type. Though this operational amplifier is a very versatile circuit element but it has some serious limitations like low frequency operation, very small slew rate, ground referred output etc. To overcome these limitations various other active building blocks which have different architecture have been proposed by various researchers from time to time. These include current conveyors, operational transconductance amplifier, various derivatives of current conveyors, operations floating amplifiers/operational mirrored amplifier/four terminal floating nullor, operational transresistance amplifier etc. Each one of these active building blocks has some characteristics those claim to be an improvement over certain disadvantages of traditional operational amplifiers. Noise is another factor that limits the performance of an instrumentation system. Noise from extraneous sources tends to be injected into the analog signal processing circuitry, where they may cause a serious deterioration of the signal to noise ratio. To reduce these problems, designers of analog ICs usually build their circuitry as differential rather than single-ended structure. A further improvement is obtained if the circuitry is not simply differential but fully balanced. In fully balanced architectures the output of the amplifiers is also in differential form making the cascadability of fully differential structures possible. This area of research is in the process of development. In the present dissertation some studies on fully differential active building blocks and their application in signal processing has been presented.