STUDY AND IMPLEMENTATION OF CURRENT CONVEYOR BASED FILTER REALIZATION AND COMPONENT REALIZATION

DISSERTATION

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OF

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ABSTRACT

Current conveyors are very important active building blocks used for analog signal processing. Current conveyors and their various derivatives are used for performing signal processing functions like amplification, filtering (both in voltage mode and current mode) and signal generation under different performance requirements. Different realization of current conveyors has been presented in the literature during past several decades. The second generation current conveyor is a three terminal active building block in which one of the input terminals has infinite input impedance whereas the other input terminal has zero input impedance. The output terminal has infinite output impedance (behaves as an ideal current source). The current conveyor can be used in both voltage mode as well as current mode circuits. Current conveyors have also been used in the realization of simulated immittances. Though the current conveyor is not available as a standard IC from major IC manufacturers many integrable realization of the current conveyor (both in bipolar and CMOS forms) are available in the open literature. In the present work a comparative study of different signal processing functions namely filter realizations and component simulations using different realizations of the second generation current conveyor has been presented.

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LIST OF SYMBOLS, ABBREVIATIONS

S. NO.	SYMBOLS/ ABBREVIATIONS	DESCRIPTIONS
1	g_m	Transconductance
2	w_o	Natural Frequency
3	Q	Quality Factor
4	V_{SS}	Source Supply Voltage
5	V_{DD}	Drain Supply Voltage
6	ASP	Analog Signal Processing
7	DSP	Digital Signal Processing
8	CMOS	Complementary Metal Oxide Semiconductor
9	OP-AMP	Operational Amplifier
10	VFA	Voltage Feedback Amplifier
11	CFA	Current Feedback Amplifier
12	IC	Integrated Circuit
13	CC	Current Conveyor
14	CCI	First generation Current Conveyor
15	CCII	Second generation Current Conveyor
16	CCIII	Third generation Current Conveyor
17	OTA	Operational Transconductance Amplifier
18	CFOA	Current Feedback Operational Amplifier
19	DCC	Differential Current Conveyor

20	DVCC	Differential voltage current conveyor
21	DVCCC	Differential Voltage Complementary Current conveyor
22	ICCII	Inverting current conveyor II
23	DDCC	Differential difference current conveyor
24	DDCCC	Differential Difference Current Controlled Conveyor
25	DCCII	Differential Current Conveyor II
26	MDCC	Modified Differential Current Conveyor
27	DXCCII	Dual-X Current Conveyor
28	FDCCII	Fully Differential Current Conveyor II
29	FBCCII	Fully Balanced CCII
30	UCC	Universal Current Conveyor
31	CCCII	Current Controlled Conveyor II
32	CGCCII	Current Gain CCII