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لم ترد بالأصل

B1155K

NOVEL CMOS AND BICMOS ANALOG CIRCUITS AND SYSTEMS

A THESIS

BY

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FOR THE DEGREE DOCTOR OF PHILOSOPHY

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ABSTRACT

The switched-current (SI) technique is a quite immature current-mode sampled-data processing technique. Further research and development has still to be done to make it competitive with today existing commercial techniques.

One of the objectives of this research is to investigate novel structures that are advantageous compared to existing structures in terms of performance and signal processing accuracy.

Proposed techniques to improve the switched-current (SI) memory cell performance are presented. The first technique is mainly aimed to eliminate the charge injection in S2I memory cell that due to biasing current. The second technique is aimed to reduce the error due to non-zero output-input conductance ratio in the S2I memory cell.

In this thesis the advantages of using BICMOS current memory cell are presented. As application of BICMOS current memory cell, a design procedure of a third order low pass elliptic filter is presented.

The techniques of programming Q and center frequency ω_0 independently based on second generation switched-current technique are presented. The most important advantage of these techniques is that they do not use programming switches in the signal path.

A new approach to develop Field Programmable Analog Arrays (FPAAs) which is based on switched-current technique is presented. The Configurable Analog Cell (CAC) is based on switched-current integrator. This (CAC) is easily configured to perform basic functions such as amplifications, attenuation, inversion, summation and integration. These elementary operations may then be combined to obtain more complex signal processing, such as filtering and data conversion. The proposed FPAA architecture has many

advantages such as it does not use extra switches to achieve the conductivity between the cells. It also does not use any switches in the signal path to reconfigure the cell. The use of a standard digital CMOS process makes the FPAA an attractive choice to integrate with its digital counter part (FPGA) to create field programmable mixed signal array.

As an example for FPAA a 5th order low pass ladder filter is presented.

**To my parents, wife, and daughters Yasmin & Yomna,
in deep gratitude for their constant encouragement**

ACKNOWLEDGEMENTS

First I would like to acknowledge Dr. Sherif Embabi for his superb guidance in my Ph. D. research. I greatly appreciate the fact that he welcomed me as a member of his research-team at Texas A&M University, and that he has guided me into the world of analog circuits and systems design. I would like to thank Prof. Aly E. Salama for recommending and assisting me to be member in the microelectronics group at Texas A&M University, and also for his superb guidance. I would like to thank Dr. Ahmed El-Gaafary for helping me a lot during my research. I appreciate the support from Dr. Ahmed Hussien.

I wish to express appreciation for microelectronics group at Texas A&M University, especially Prof. Edgar Sanchez-Sinencio, Dr. J. Pineda and Prof. M. Schneider for their always open doors to me. Also the Ph. D. students , M. Grimaila, X. Quan, G. Han, M. Ibrahim and A. Reyes for their helping me during this research.

I would like to thank Dr. John B. Hughes at Philips Research Laboratories in Redhill, England, Prof. Antonio C. M. de Queiroz at the Federal University of Riode Janerio, Brazil

Dr. B. Jonsson & Dr. H. Traff at Linkoping University, Sweden, and Prof. T. Inoue at Kumamoto University, Japan, for many very useful discussions I have had with all of them about Switched-current technique.

I would like to thank my wife and my daughters for patiently enduring 30 month of my long hours and lost weekends at the office.

Without helping from ALLAH , loving parents, my sisters and close friends I would not have had the strength to carry on.

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