



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكرو فيلم

بسم الله الرحمن الرحيم



MONA MAGHRABY



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التوثيق الإلكتروني والميكروفيلم



شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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MONA MAGHRABY



A PIPELINE ADC USING ENHANCED-LINEARITY RING-AMPLIFIER

By

Ahmed Gharib Abdelraouf Ahmed Gadelkarim

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
MASTER OF SCIENCE
in
Electronics and Communications Engineering

FACULTY OF ENGINEERING ,CAIRO UNIVERSITY
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Under the Supervision of

Prof. Ahmed Nader Mohieldin Prof. Mohamed Mostafa Aboudina

Professor

Associate Professor

Electronics and Communications Engineering

Electronics and Communications Engineering

Faculty of Engineering , Cairo University

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Approved by the Examining Committee:

Prof. Ahmed Nader Mohieldin,	Thesis Main Advisor
-------------------------------------	---------------------

Prof. Ahmed Hussien Khalil,	Internal Examiner
------------------------------------	-------------------

Prof. Sameh Assem Ibrahim,	External Examiner
Associate Professor	
Faculty of Engineering, Ain Shams University	

FACULTY OF ENGINEERING ,CAIRO UNIVERSITY
GIZA,EGYPT
2020

Engineer's Name: Ahmed Gharib Abdelraouf Ahmed Gadelkarim
Date of Birth: 30/08/1992
Nationality: Egyptian
E-mail: agharib.gadelkarim@gmail.com
Phone: 01004792922
Address: El-Mohawelat ST., El-Haram St., Giza, 12518
Registration Date: 01/03/2016
Awarding Date: --/2020
Degree: Master of Science
Department: Electronics and Communications Engineering



Supervisors:

Prof. Ahmed Nader Mohieldin
Prof. Mohamed Mostafa Aboudina

Examiners:

Prof. Ahmed Nader Mohieldin (Thesis Main Advisor)
Prof. Ahmed Hussien Khalil (Internal Examiner)
Prof. Sameh Assem Ibrahim (External Examiner)
Associate Professor
Faculty of Engineering, Ain Shams University

Title of Thesis:

A Pipeline ADC using Enhanced-Linearity Ring-Amplifier

Key Words:

Ring amplifier, Adaptive slew-rate, Linearity enhancement, ADC, Energy efficient.

Summary:

This thesis proposes a slew rate enhancement technique which solves the fundamental trade-off between speed and stability. The proposal is to use a rail-to-rail controlled feedforward path to be used in parallel with an original ring amplifier. This feedforward path boosts the linearity of the amplifier significantly without any stability degradation. The linearity improvement is achieved by enhancing the slew rate of the used amplifier while minimizing the overhead current consumption. Thus, using this feedforward path enhances the linearity for almost the same current consumption, hence reducing the overall system figure of merit (FoM). The core idea of the thesis has been verified using M-DAC architecture with unity closed loop gain. The proposal enhances the total harmonic distortion by 10dB while reducing the overall FoM by more than half compared to state-of-the-art techniques. Then, a 10-bit 1.5-bit/stage pipeline ADC has been implemented using this adaptive ring-amplifier. The full system has been implemented using TSMC 65nm CMOS technology and 0.9V supply voltage.

Disclaimer

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

Name: Ahmed Gharib Abdelraouf Ahmed Gadelkarim Date:--/--/2020

Signature:

Dedication

I would like to dedicate this work to my parents who are without them I would not be able to do anything.

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