

## Special Issue on Analog and Mixed-Signal Integrated Circuits

### Message of Guest Editors

The demand for analog and mixed-signal integrated circuits has increased significantly in the last decades, although we have been living in a “digital era”. One of the reasons for such high demand is simply explicated by the increase of devices in our daily life. Such scenario can be simply called as “Ubiquitous computing” and/or the Internet of Everything.

Some of these applications strongly depend on the functions that are only implemented by analog circuits. Others, although can be realized in the digital domain, they are much more efficiently performed if done in the analog one. In this scenario, the design constraints for analog and mixed-signal integrated circuits become very stringent. This is especially true for new CMOS processes that are optimized for digital applications. A few examples of the design specifications are low supply voltage operation, robustness against PVT variations, low noise performance, and low power consumption. These challenges continue to fuel research and the development of new and optimized analog circuit topologies.

This Special Issue brings ten invited papers from experts in the field. The readers will be provided with an extensive literature review. In the following, we present a brief description of the papers appearing in this Special Issue. We start this issue with three papers whose content is really important for applications that must operate under low power and/or low voltage operation. Such design specification is especially important for applications that depend on batteries or must harvest energy from the environment.

Girardi, Compassi-Severo, and Aguirre present an interesting tutorial on design techniques for ultra-low voltage analog circuits using CMOS characteristics. Different amplifiers were employed as a case study, but the techniques discussed can be employed in any analog circuit. Machado and Radin present an overview of voltage oscillators that operates with a supply voltage lower than 100 mV. Castellanos presents a review of the integrated hybrid switched converter – a kind of architecture that make be possible to achieve hard design specifications not easily achieved by traditional power converters.

Besides low voltage and low power operation, another concern of analog designers is the robustness again noise, and fabrication process effects. These specifications can be achieved by efficient design and layout techniques. These two important topics are addressed in the next two papers. Reis Filho presents a review of offset and noise reduction techniques for CMOS amplifiers, while Ferreira, Avignon-Meseldzija, Benabes, and Trelin present a very interesting review of layout techniques.

The next three works present a review of three very important classes of analog circuits. Fernandez, Leon, Alvarez, Hizon and Rosales focus on CMOS thyristor delay elements. De Deus, Catunda, Soares, and Belfort discuss a survey on variable and programmable gain amplifiers. In addition, Casañas et al present a review of current reference circuits.

Last but not least, two papers on CMOS operational transconductance amplifiers are presented. The first one from Braga, Silva, and Karolak brings a review of OTAs, while the second one from Aminzadeh and Colombo, presents an analysis and design procedure based on the settling time specification

Enjoy the reading!

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