

PROGRAMMABLE SWITCHED CURRENT FILTERS

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ABSTRACT

A new technique to achieve switched current filters (SI) is presented. The basic element of the filters is a current mirror that employs MOS transistors and an operational amplifier. Programmability of the current mirror is obtained from using MOSFET-only current dividers. User programmable analog function in digital CMOS technology and, particularly, in sea-of-gates is the main envisaged application of the proposed technique.

INTRODUCTION

Switched capacitors (SC) and switched currents (SI) are the sampled data processing techniques in use nowadays. The driving force behind the development of the SI technique at the end of the last decade was its full compatibility with conventional VLSI processes. However, the digital programming of conventional analog filters achieved by selecting different combinations of either capacitors or current mirrors require a large silicon area.

In this paper we show a procedure that employs opamps, MOSFET-only programmable current attenuators, switches and grounded capacitors to realize SI filters. This approach to implement programmable filters takes advantages of the reduced area, proportional to the number of bits of programmable MOSFET-only attenuators. The use of the opamp as the active device allows a simple and modular design of the filter.