Investigating Noise Performances of MOSFET-Only Filters

Abdullah Yesil[1*]

[1]*Department of Naval Architecture and Marine Engineering, Bandirma Onyedi Eylul University, Balıkesir, TURKEY*
[*]Corresponding author: ayesil@bandirma.edu.tr
[+]Speaker: ayesil@bandirma.edu.tr
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Abstract – Analog filters have an important role in modern communication systems. Filter circuits with low noise, which occupy less chip area and consume less power as well as operate in the high-frequency region, are required with the developing technology. In the literature, MOSFET-only filters are made up of only CMOS transistors without utilizing active elements such as a second-generation current conveyor, a transconductance amplifier, an operational amplifier, differential voltage current conveyor and current difference transconductance amplifier. Transconductance gain and gate to source capacitances related to CMOS transistors are utilized in MOSFET-only filters. Therefore, MOSFET-only filters enjoy some advantages that less chip area and power dissipation and operating in the highfrequency region. Furthermore, the noise performances of them are important in analog filter circuits. The noise performance of the filter circuit is effective as the desired signals are obtained. In this work, noise performances of the previously presented two MOSFET-only filters have been investigated. Neither their noise simulation results nor their input referred noise equations have been obtained. Since the previously presented filters operate at high frequencies, the thermal noise is only taken into account when examining the noise performances of them. In order to make a fair comparison with analog filters in the literature, input referred noise equations of them have been found.
Noise simulation results are in agreement with the theoretical results of them.

Keywords- Noise performance, MOSFET-only filters, input referred noise equation, CMOS simulation results