New low-voltage electrically tunable triode-MOSFET transconductor and its application to low-frequency Gm-C filtering

Dualibe, Fortunato Carlos Augusto, Petrashin, Pablo Antonio, Toledo, Luis and Lancioni, Walter José (2005) *New low-voltage electrically tunable triode-MOSFET transconductor and its application to low-frequency Gm-C filtering.* In: 18th Symposium on Integrated Circuits and Systems Design.

RESUMEN

A new low-voltage electrically tunable transconductor is presented. Its transconductance can be settled by means of a ratio between a reference current and a reference voltage rendering the circuit independent of technological parameters, to a first order approach. This property allows, to some extent, reusing the transconductor in several CMOS processes. A kind of linear current division strategy turns also the transconductance inversely proportional to a product of two ratios between transistors' sizes that can be chosen so as to meet the desired Gm order of magnitude. This feature, together with a low-current biasing policy, is exploited in order to get a transconductance in the range of InS, as needed for very low-frequency filters. For a 2V supply and a 20pF load capacitor, an integrator characterization in a 1.6µm CMOS technology revealed a unity-gain frequency fT of 10Hz, a current consumption of 220nA and an input-referred noise of 2.2µVrms. Using this transconductor, a 10Hz third-order low-pass transconductance-capacitor (Gm-C) Butterworth filter was designed. It is intended for smoothing the output of a chopper amplifier. The filter shows acceptable performance in terms of die area (1.9mm2) and power consumption (1µW), as desired for Low-Voltage Low-Power (LVLP) applications.

TIPO DE DOCUMENTO: Documento de conferencia (Artículo)

DOI: https://doi.org/10.1109/SBCCI.2005.4286858

PALABRAS CLAVE: Analog CMOS. Gm-C filter. Instrumentation amplifier. Low-frequency. Low-power. Low-voltage. Transconductor.

TEMAS:	T Tecnología > TK ingeniería eléctrica. Ingeniería electrónica nuclear
UNIDAD ACADÉMICA:	Universidad Católica de Córdoba > Facultad de Ingeniería