

Abstract:

A systematic generation method of the single input single output transconductance amplifier (TA) based on using nodal admittance matrix (NAM) expansion is given. The four pathological elements used are the nullator, norator, voltage mirror (VM) and current mirror (CM). The single input single output TA also known as the voltage controlled current source (VCCS) includes two types depending on the direction of the output current. Two pathological realizations for each type using grounded resistor are given and eight pathological realizations for each type using floating resistor are also derived. Applications of TA in realizing grounded and floating resistors, grounded and floating inductors, first order voltage mode and current mode all pass filters, Tow Thomas second order filter, universal second order voltage mode and mixed mode filter using five single input differential output TA and one single input single output TA and oscillators using a single input single output TA are included.