

Preface

In spite of all electronic systems prominently being dominated by digital circuits and systems, the analog circuits have neither become obsolete nor avoidable. In fact, despite the dominance of digital circuits, analog circuits and techniques continue to be indispensable and unavoidable in many areas since all real life signals are analog in nature. Thus, several types of processing of natural signals or interface of such signals with digital processing circuits has to be necessarily carried out by analog circuits. Also, many basic functions such as amplification, rectification, continuous-time filtering, analog-to-digital conversion and digital-to-analog conversion etc. need analog circuits and techniques.

Traditionally, the integrated circuit (IC) op-amp has usually been considered to be the workhorse of all analog circuit designs. However, over the years, it was found that there are many situations such as realization of voltage controlled current sources, current controlled current sources, instrumentation amplifiers, non-inverting integrators and non-inverting differentiators etc., where the traditional voltage mode op-amp (VOA)-based circuits suffer from two drawbacks namely employment of more than the minimum required number of passive components and requirement of perfect matching of several of them (due to which any mismatch may not only deteriorate the performance of the intended circuits but may also lead to instability in some cases). Furthermore, VOA-based amplifiers exhibit a gain bandwidth conflict and their frequency range of operation is limited by the effect of finite gain bandwidth product (GBP) of the op-amps on one hand and due to the slew-induced distortion (resulting due to finite slew rate of the op-amps) on the other hand. Consequently, there has been continuous search for alternative analog circuit building blocks to overcome these difficulties while still matching the versatility of the VOAs in realizing almost all kinds of analog functions.

During the past four decades, many alternative new analog circuit building blocks have been proposed out of which only the Operational Transconductance Amplifiers, Current Conveyors and Current Feedback Operational Amplifiers have been made available as of-the-shelf ICs and have therefore attracted the attention of educators, researchers and circuit designers worldwide who have explored their various applications. Among these building blocks, the current