Abstract

Continuous-time (CT) active filters are usually implemented based on biquad circuit or simply biquad, which are the second-order circuits. As the operational transconductance amplifier (OTA) is very famous, various integrator-loop OTA-C biquads are proposed in both voltage and current mode. Though these biquads are usually unique and attractive, the presence of capacitor is unfriendly to an IC. As other active devices, the OTA is suffered from nonidealities including the parasitic capacitance. If these parasitic capacitances can be utilized effectively, capacitorless OTA-based biquads may be available by simply removing the capacitors of existed OTA-C biquads. However, the properties of these parasitic elements are very hard to express mathematically, which is virtually close the opportunity to synthesize the transfer function of an OTA-based capacitorless biquad. Therefore, computational intelligence (CI) techniques which are the supervised learning artificial neural network (ANN), the genetic algorithm (GA), and the particle swarm optimization (PSO) are deployed to model or tune the response of an OTA-based bandpass biquad. The results indicate possibility of tuning with quite long tuning time for the GA and PSO. The ANN is contrary because it can provide tuning in an instant but suffer from unreasonably long training time.