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Title: Universal filters of arbitrary order and type employing square-root-domain technique

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Abstract

Novel Single Input Multiple Output (SIMO) and Multiple Input Single Output (MISO) universal filter topologies of arbitrary order and type are introduced in this paper. The proposed topologies have been realised by employing Square-Root Domain (SRD) technique. An offered benefit of the universal filter topologies is that only grounded capacitors are required for their implementations and the resonant frequency of the filters can be electronically controlled by an appropriate dc current. The proposed universal filters simultaneously offer all the five standard filtering functions i.e. Lowpass (LP), Highpass (HP) and Bandpass (BP), Bandstop (BS) and Allpass (AP) frequency responses. In addition, the SIMO topology is generic in the sense that it can yield four different stable filter configurations. Two design examples are provided in each configuration and the correct operation of the corresponding topologies has been evaluated through the PSPICE software with BSIM 0.35-μm CMOS process model parameters.