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**Title:** A DC stabilized log-domain \( n \)-th order multifunction filter based on the decomposition of \( n \)-th order HP filter function to FLF topology.

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**Abstract**

The design of high-order log-domain filters can be easily accomplished by transposing already known linear-domain \( G_m-C \) filter topologies to their counterparts in the log-domain through the employment of a set of complementary operators. To achieve the \( G_m-C \) filter topologies, the multiple feedback approach is widely used due to its accrued advantages. In this paper a synthesis approach for the development of an \( n \)-th order multifunction log-domain filter comprising lowpass (LP), highpass (HP) and bandpass (BP) filter functions is proposed. The approach is based on the decomposition of \( n \)-th order HP filter function to follow-the-leader-feedback (FLF) topology. The design is simple and simultaneously achieves nearly all of the chief advantages. The design offers superior performance factors vis-à-vis the ones recently reported. To verify the high-order behavior of the topology, a 5th-order multifunction filter was designed and the achieved simulated results verify the theory.

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