

IEEE Circuits and Systems

MAGAZINE

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Features

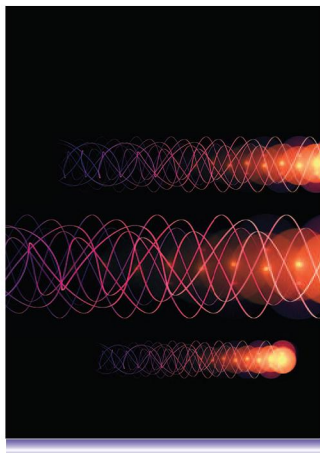


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8 FIR Filter Design Using Optimal Factoring: A Walkthrough and Summary of Benefits

Alireza Mehrnia and Alan N. Willson, Jr.

Decomposing an FIR filter into a cascade of blocks, each representing an optimal factor of $H(z)$, the filter's transfer function, can start with the complex-conjugate pairs of zeros of $H(z)$ and then creating optimal pairings of these zero-pairs. This leads to a general method for designing FIR filters having minimal hardware complexity. We illustrate this concept, further techniques, benefits, and performance improvements in this paper, highlighting the practical features of the design method. It is also shown that the resulting structure can achieve lower hardware complexity, when compared with the prior art.

22 RF Energy Harvesting for Embedded Systems: A Survey of Tradeoffs and Methodology

Tolga Soyata, Lucian Copeland, and Wendi Heinzelman

This paper presents an overview of passive Radio Frequency (RF) energy reception and power harvesting circuits for isolated communications and computing systems lacking access to primary power sources. A unified understanding of the energy harvesting alternatives is provided, followed by an elaborate study of RF energy harvesting within the context of embedded systems. A detailed discussion of RF technologies ranging from the directed communications signal reception to dispersed ambient power harvesting is provided. A comparative focus on design tradeoffs and process alterations is provided to represent the diversity in the applications requiring wireless RF harvesting units.

58 A Survey of Emerging Interconnects for On-Chip Efficient Multicast and Broadcast in Many-Cores

Ammar Karkar, Terrence Mak, Kin-Fai Tong, and Alex Yakovlev

This article aims to drive the research community to achieve a better utilization of the merits of on-chip interconnects and addresses the challenges involved. New interconnect technologies, such as optical interconnect, wireless NoC (WiNoC), RF transmission lines (RF-I) and surface wave interconnects (SWI), are discussed, evaluated and compared. Consequently, these emerging interconnects can continue to provide the cost efficiency and performance that are highly demanded for future many-core processors and high performance computing.

(continued)

73 Visual Informatics Tools for Supporting Large-Scale Collaborative Wildlife Monitoring with Citizen Scientists

Zhihai He, Roland Kays, Zhi Zhang, Guanghan Ning, Chen Huang, Tony X. Han, Josh Millspaugh, Tavis Forrester, and William McShea

Collaborative wildlife monitoring and tracking at large scales will help us understand the complex dynamics of wildlife systems, evaluate the impact of human actions and environmental changes on wildlife species, and answer many important ecological and evolutionary research questions. To support collaborative wildlife monitoring and research, we need to develop integrated camera-sensor networking systems, deploy them at large scales, and develop advanced computational and informatics tools to analyze and manage the massive wildlife monitoring data.

Departments

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Scope: Insofar as the technical articles presented in the proposed magazine, the plan is to cover the subject areas represented by the Society's transactions, including: analog, passive, switch capacitor, and digital filters; electronic circuits, networks, graph theory, and RF communication circuits; system theory; discrete, IC, and VLSI circuit design; multidimensional circuits and systems; large-scale systems and power networks; nonlinear circuits and systems, wavelets, filter banks, and applications; neural networks; and signal processing. Content will also cover the areas represented by the Society technical committees: analog signal processing, cellular neural networks, and array computing, circuits and systems for communications, computer-aided network design, digital signal processing, multimedia systems and applications, neural systems and applications, nonlinear circuits and systems, power systems and power electronics and circuits, sensors and micromachining, visual signal processing and communication, and VLSI systems and applications. Lastly, the magazine will cover the interests represented by the widespread conference activity of the IEEE Circuits and Systems Society. In addition to the technical articles, which may be seen as the centerpiece of the start-up plan, we plan also to cover Society administrative activities, as for instance the meetings of the Board of Governors, Society People, as for instance the stories of award winners-fellows, medalists, and so forth, and Places reached by the Society, including readable reports from the Society's conferences around the world.



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