Distinguished Lecturer Gabor Temes Speaks at EPFL

On 30 August 2017, Gabor Temes delivered a Distinguished Lecture, "System-Level Noise Filtering and Linearization Scheme," as an invited speaker of the Electrical Engineering Institute, at the Swiss Federal Institute of Technology (EPFL), Lausanne. The lecture was attended by an audience of more than 100 scientists, engineers, and students, filling the largest auditorium in the electrical engineering building at EPFL. The Temes lecture was one of the more memorable events of the year, celebrating the 30th anniversary of the MEAD lecture series organized each year in Lausanne and marking the beginning of the 2017–2018 academic year.

The performance of an analog IC is limited by the noise generated in its components. Some of these noises (thermal and shot noises) have a white spectrum, while others (dc offset and 1/f noise) are restricted to a narrow frequency range near dc. Several circuit techniques (correlated double sampling and chopping) exist for mitigating the effects of the low-frequency noise components. In this lecture, a different design approach is described for suppressing low-frequency noise. Unlike earlier techniques, the proposed process also reduces even-order distortion, which is another major limitation of analog circuits. It, therefore, may allow the use of single-ended circuits in some applications where differential structures are usually needed. For a specified performance, this may allow a significant reduction, as much as 40–50% in complexity and power dissipation compared to the equivalent differential implementation.

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Temes gave a compelling account of the new design approach proposed for suppressing low-frequency noise, with a very wide range of potential applications in circuit design. The subsequent questions and comments from the audience highlighted the potential value of the novel approach, with the promise of significant improvements in noise performance.

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For more than three decades, prolific research in analog and digital signal processing and mixed-signal integrated electronics has had a profound and broad impact, ranging from classical network theory to active filter synthesis to monolithic filter and data converter design. As a professor of engineering at Oregon State University in Corvallis, Temes is a leading authority on delta-sigma data converters. His research on filter design, optimization methods, and low-sensitivity filter structures significantly helped the explosive growth of analog signal processing in metal-oxide-semiconductor IC technologies during the last 30 years. His work in switched capacitor filters helped define communications chips in the 1980s by conceiving fundamental design methods for them.

As an educator, Temes has been responsible for several seminal texts on analog signal processing and has coauthored several widely used reference books, including the newly published second edition of *Understanding Delta-Sigma Data Converters* (Wiley, ISBN: 1119258278), coauthored by Shanti Pavan and Richard Schreier. This book is a completely updated and enhanced version of the material in the popular first edition, emphasizing continuous-time and incremental analog-to-digital conversions, with design examples as well as computer tools for designers.

An IEEE Life Fellow, Temes received the IEEE Circuits and Systems Society (CAS) Darlington Award and the CAS Education as well as technical achievement awards. He received the 1998 IEEE Graduate Teaching Award, the 2006 IEEE Gustav Robert Kirchhoff Award, and the 2009 CAS Mac Van Valkenburg Award.

—Yusuf Leblebici