Plenary Talks

On the Roots of Digital Signal Processing - 1770 to 1970
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Offshoring - Economic, Social, and Technical Implications
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Abstract: Certain landmark discoveries over the period 1770 to 1970 that led to the emergence of what we refer to today as Digital Signal Processing will be examined. To start with, it will be shown that many of the mathematical tools for spectral analysis were introduced by a group of French mathematicians who studied or taught at Ecole Polytechnique in Paris during or soon after the French Revolution over a period of no more than 50 years or so. Lagrange and Laplace were teachers of Fourier and Poisson and Fourier was a teacher of Dirichlet. The latter added a great deal to Fourier analysis. A contemporary of Fourier, Poisson is known for the Poisson Summation formula which can be used to obtain the spectrum of a discrete-time signal. Cauchy and Laurent followed later to propose mathematical innovations in complex analysis that are closely linked to the z transform. The processing of numerical data by machines was explored by many, including Pascal and Leibniz, but the most ambitious attempt was by Babbage who is often regarded as the father of computing. However, the presentation will show that contrary to popular belief, what Babbage attempted to do during his entire professional life was to build a mechanical discrete system that would compute the entries of numerical tables and also print the tables in a single consolidated operation. The lecture will also deal with the origins of the sampling theorem which is attributed to Nyquist and/or Shannon. Actually, this famous theorem was discovered independently by several engineers or scientist around the 1930s and 1940s but the underlying principles were known to mathematicians long before that time and are closely related to an interpolation method due to the great Lagrange who was also connected with Ecole Polytechnique.

Biography: Andreas Antoniou is a Fellow of the IET (previously known as IEE) and the IEEE. He taught at Concordia University from 1970 to 1983, was the founding Chair of the Department of Electrical and Computer Engineering, University of Victoria, B.C., Canada, from 1983 to 1990, and is now Professor Emeritus. He is the author of Digital Signal Processing: Signals, Systems, and Filters published by McGraw-Hill in 2005 and the co-author with Wu-Sheng Lu of Optimization: Algorithms and Applications published by Springer in 2007. Dr. Antoniou served first as Associate and later as Chief Editor for the IEEE Transactions on Circuits and Systems from 1983 to 1987, as Distinguished Lecturer of the IEEE Signal Processing Society in 2003, as General Chair of the ISCAS 2004, and is now serving as Distinguished Lecturer of the CAS Society.

He received the Ambrose Fleming Premium for 1964 from the IEE (best paper award), a CAS Golden Jubilee Medal, and the IEEE CAS Technical Achievement Award for 2005. He was awarded the BC Science Council Chairman's Award for Career Achievement for 2000 and an Honorary Doctorate by the National University of Athens, Greece.