Books on Math, Signal Processing, Trials, and Advice on How To Get Through a Ph.D. Program

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All reviewed by Ross Gagliano

THE PRINCE OF MATHEMATICS: CARL FRIEDRICH GAUSS
by M. B. W. Tent
(A. K. Peters, Ltd., 2006)

Review by Ross Gagliano

Mathematics teacher M. B. W. (Bunnie) Tent (nee Wyman) has put together a smallish (245 pages) yet thoroughly delightful account of the life and contributions of the stellar and well-known German mathematician, Gauss. Her book is intended for all ages, from school children to adult professionals, and is based on actual diaries and letters written by the "Prince of Mathematics" himself.

After an apparent extensive research into original manuscripts as well as many other secondary sources, Tent further toured several Gaussian sites and repositories in Germany, impressing both curators of museums as well as heads of relevant technical societies with her thorough effort and infectious zeal.

Through a series of some two dozen dialogues, Tent creates a remarkable conversational biography. In this way she is able to reveal fascinating detail about not only life in 18^{th} century Europe, but also how modestly some of the great mathematical results began. Described are personal and colorful insights into Gauss' many discoveries; e.g., prime numbers, infinite series, logarithms (where he saw poetry), and the calculation of important dates (Easter) in the calendar.

Gauss' appellation as "Prince of Mathematics" is due in no small part to the numerous and varied contributions that he made to a variety of scientific fields in addition to mathematics. Although he became a distinguished professor, he also practiced as an astronomer and land surveyor, contriving many of his ideas from real-world problems (making change, computing

sums, determining geometrical and trigonometric values, etc.) that he observed initially and firsthand through the labor of his stonemason father.

This book is well worth the cost and time to gain knowledge of the life and interests of Gauss, his phenomenal childhood achievements, and his lifetime of contributions that are so often taken for granted today. Impressive also is his penmanship and his grasp of several natural languages, both modern (German and French) and ancient (Latin and Sanskrit).

The author is a native of Massachusetts and graduated from Mount Holyoke College. In her many years of teaching mathematics, she has developed a knack for integrating the history and personalities of mathematicians. She currently resides and teaches in Birmingham, Alabama.

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DIGITAL SIGNAL PROCESSING: USING MATLAB AND WAVELETS
by Michael Weeks

(see author profile at:
http://www.amazon.com/gp/pdp/profile/A1IUV8JNI1N8JC)
(Infinity Science Press, 2006)

Review by Ross Gagliano

Michael Weeks may have discovered an interesting albeit important niche as there were, only just a short time ago, few if any books on digital signal processing (DSP) for computer science majors. Moreover, it is an area that is now rife with very valuable and timely applications; i.e., video games, audio and graphical processing, plus many biomedical and bioinformatic examples (genetics, organic compounds, etc.).

Rather than treating these topics strictly in a traditional mathematical way, Weeks' approach espouses the use of the powerful software suite MATLAB® together with the very recent development in wavelets and their transforms, especially in the new image compression standard JPEG 2000.

In fact, MATLAB also now includes an extensive set of toolboxes specifically for DSP. All in all, this text presents many of these complex topics in a modest, yet thoroughly understandable fashion, but always beginning with and based on first principles

After a short introduction into MATLAB, Weeks discusses several fundamental electrical engineering concepts such as filtering and sampling, as well as associated mathematical preliminaries including complex numbers, Fourier and Z transforms, then finally the very recently developed wavelets and its transform, the Discrete Wavelet Transform (DWT).

His list of over 100 applications includes: sound (WAV files), imaging (TIFF files), the Sudoku puzzle, and general issues of compression and decompression (lossy vs. lossless), etc. A CD is provided that contains an enormous set of source code (from a few to dozens of MATLAB programs [m files] per each of the 10 chapters), 144 figures [GIF files] for various discussions in the book, and 45 projects [more m files] for corresponding chapters and applications.

We are obviously in an era of an ever-increasing presence of cable and satellite microwave distribution, cell phones, IPods, digital photography, and software editors for imagery and digital orchestration. Thus, the need is abundantly clear for academic preparation, not to mention mid-career professional development, in DSP, particularly for computer scientists who are attracted to these newer and critical fields. In either case, this primer should be of tremendous value.

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BOOKS BRIFLY NOTED:

Published by AuthorHouse (2006), **Justice for All: Legendary Trials of the 20th Century** was written by *Daniel J. Lanahan*. Born in Brooklyn, he was educated at Long Island and Temple universities prior to receiving his law degree from San Francisco. He specializes in complex litigation and international law, and his book sketches some 19 well-known US trials of the past 100 years. Also used as a textbook, it demonstrates that often in the legal field, as elsewhere, "what goes around comes around." Famous cases include Lizzi Borden, Sacco and Vanzetti, Leopold and Loeb, Nuremburg,

Scopes, Bakke, and the impeachments of Presidents Andrew Johnson and Bill Clinton. For more information: see http://www.lanahan.com.

Samuel E. Jones was born in Birmingham, receiving degrees in psychology and counseling from Cal-State Fullerton and the University of Alabama. His self-published (Spare Not Publishing, 2006) **Just What the Ph.D. Ordered: Developing A Strategic Plan For the First 18 Months of Your Doctoral Program** is a personal guide to successfully transforming educational goals into reality. As this primer focuses mainly on the liberal arts, science and engineering candidates should supplement with other subject-based sources. Nonetheless, Jones presents interesting, informative, and helpful advice and strategies. In a series of checklists and tables, he incorporates folksy down-home practical suggestions with lofty, idealistic theories. This is a must read for the pedigree motivated, or, as he calls them, the "Forward Movers." Check his web site at: http://www.samuelejones.com.

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OUR REVIEWER

Ubqiuity associate editor Ross Gagliano is a retired professor, having helped found the computer science department at Georgia State University. He previously was a senior researcher at the Georgia Tech Research Institute.