IEEE Systems Council Chapter presents IEEE Distinguished Lecture Series on

The Things We Ought to Know About Digital Communications (Part III)

Dr. Bernard Sklar

Date: Nov. 28, 2016 (Mon)
Time: 4:15 – 4:30pm Social/Network
4:30 – 6:30 Seminar
Location: VEC 501, CSULB

Abstract: This third part of the series continues to reinforce the basic tools that we communication engineers need to carry with us. We move into the more recent error-correction techniques, such as turbo and low-density parity-check (LDPC) coding. Turbo codes were the first forward-error-correcting (FEC) codes that introduced feedback. We review the rules involving what must never be fed back to another decoder. We describe the maximum a-posteriori (MAP) algorithm, and how it is implemented to yield bit-by-bit probabilities. We move on to the fundamentals of LDPC codes, Tanner graphs, and the message-passing algorithm. Both turbo and LDPC codes asymptotically approach the Shannon limit. We describe spread-spectrum signaling, and once again illustrate the importance of "equating like things to like things." We also use an easy-to-understand model to demonstrate the workings of a rake-receiver. This fast-moving talk is geared toward designers, managers, software developers, and whoever wants to partake in this exciting field.

About Speaker: Dr. Bernard Sklar has over 50 years of technical experience at the following companies: Republic Aviation, Hughes Aircraft, Litton Industries, and The Aerospace Corporation. At Aerospace, he helped develop the MILSTAR satellite system, and was the principal architect for EHF Satellite Data Link Standards. Currently, he is the Director of Advanced Systems at Communications Engineering Services, a consulting company he founded in 1984. He has taught engineering courses at several universities, including the University of California, Los Angeles and the University of Southern California. He is an External Examiner of Digital Communication Engineering at the University of Cape Town, South Africa, and has presented numerous training programs throughout the world. Dr. Sklar has published and presented over 90 technical papers. He received the 1984 Prize Paper Award from the IEEE Communications Society for his series on digital communications, and he is the author of the book, *Digital Communications: Fundamentals and Applications*, 2nd Edition, Prentice-Hall, 2001. His academic credentials include a B.S. degree in Math and Science from the University of Michigan, an M.S. degree in Electrical Engineering from the Polytechnic Institute of Brooklyn, New York, and a Ph.D. degree in engineering from the University of California, Los Angeles.

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