missibility conditions for ternary GPN sequences lead to many new ternary GPN sequences.

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REFERENCES

[1] S. W. Golomb, *Shift Register Sequences.* San Francisco: Holden-Day, 1967.
[2] ——, *Digital Communications with Space Applications.* Englewood Cliffs, NJ: Prentice-Hall, 1964.
[3] W. D. T. Davies, *System Identification for Self-Adaptive Control.* London: Wiley-Interscience, 1970.
[4] M. Hall, *Combinatorial Theory.* Waltham, MA: Blaisdell, 1967.
[5] W. D. Wallis, A. P. Street, and J. S. Wallis, *Combinatorics; Room Squares, Sum-Free Sets, Hadamard Matrices.* Berlin: Springer-Verlag, 1972.
[6] L. D. Baumert, *Cyclic Difference Sets.* Berlin: Springer-Verlag, 1971.
[7] D. N. Tompkins, *Codes with Zero-Correlation.* Culver City, CA: Hughes Aircraft Corp., June 1960.
[8] J. A. Chang, "Ternary sequences with zero-correlation," in *Proc. IEEE*, vol. 55, no. 7, pp. 1211–1213, July 1967.
[9] P. S. Moharir, "Signal design," *Int. J. Electron.*, vol. 41, no. 4, pp. 381–398, Oct. 1976.

Correction to "A New Multilevel Coding Method Using Error-Correcting Codes"

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In the above paper,[1] equation (3) and its following line should have read as follows:

$$p_i(r|s_1 \cdots s_i) = \sum_{s_{i+1}=0}^{1} \cdots \sum_{s_M=0}^{1} p_M(r|s_1 \cdots s_M) P(s_{i+1} \cdots s_M | s_1 \cdots s_i) \quad (3)$$

where $P(s_{i+1} \cdots s_M | s_1 \cdots s_i)$ is the conditional joint probability of $s_{i+1}, \cdots, s_M$, given $s_1, \cdots, s_i$. Equation (8) should have read as follows:

$$p(r|s) = \frac{1}{2\pi} \int_0^\infty \rho \exp\left[-\frac{1}{2}\left\{\rho^2 - 2\sqrt{\frac{2E_d}{N_0}}\rho \cos\left(r - \frac{2\pi}{2^M}s\right) + \frac{2E_d}{N_0}\right\}\right] d\rho. \quad (8)$$

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[1] H. Imai and S. Hirakawa, *IEEE Trans. Inform Theory*, vol. IT-23, pp. 371–377, May 1977.

Book Reviews

Optics and Information Theory—Francis T. S. Yu (New York: Wiley, 1976, 203 pp., $14.95)

CARL W. HELSTROM

This work treats a great many subjects within a thin volume: information theory, the discrete and the Gaussian channels, diffraction theory, Fourier analysis, the sampling theorem, matched filtering, detection theory, variable-length source coding, thermodynamics, entropy, Maxwell's and kindred demons, photon counting, image restoration, and quantum information channels—all in only two hundred and three pages! An ambitious project, if only Professor Yu had been able to carry it off. Unfortunately, the book shows signs of hasty preparation, and it is clear that the writer received little help from his publisher.

Where was John Wiley & Sons' copyeditor when sentences like these passed into immortal print?

"One can easily imagine that without light present civilization could never exist" (p. 1).

"Although everyone seems to know the word information, a fundamental theoristic concept may not be the case" (pp. 1–2).

"It is noted that the surface integral of the lens may be assumed to be of infinite extent, since the lens is very large compared to the spatial apertures at P_1 and P_2 paraxiality" (p. 59).

"In the classical theory of light, an observation can be made as small as we please. However, for some very small objects this assumption does not hold true" (p. 112).

A publisher owes his authors and readers more than a perfunctory glance at a manuscript before setting it into type, putting it on the market, and collecting his profit. Creative scientists like Professor Yu cannot be expected also to be skillful writers, and when they take time from their research in order to give us the benefit of their experienced thought about such broad and significant topics as "optics and information theory," they deserve competent editorial assistance. It is apparent through much of this book that the author knows what he wants to say, but needs help in saying it clearly; and that help it is the publisher's duty to provide.

Expert technical review before publication would also have been beneficial. A reviewer might have objected to the several abuses of Heisenberg's time-energy uncertainty principle $\Delta E \Delta t \geq h/4\pi$ (not h as in this book). Precise definitions of ΔE and Δt are never given, and indeed, the interpretation of this inequality is fraught with conceptual difficulties, as Allcock has shown in detail [1]. Merely to put $E = h\nu$ and associate this inequality with a Fourier transform relation $\Delta\nu\Delta t \geq 1$, as in Chapter 2, is gratuitously to introduce misconceptions. The uncertainty principle is brought in again at the beginning of Chapter 6 with the sentence, "Time and energy smaller than Planck's constant cannot be observed or measured simultaneously"; and from the inequalities $\Delta E \Delta t \geq h$ and $\Delta E > \gamma kT$ we find on p. 137 the mathematically questionable inequality $\Delta t \lesssim h/\gamma kT$ derived and interpreted. The uncertainty principle suffers its worst humiliation in Chapter 7 when it is linked to an inequality from photography, $It \geq E_0$, "where E_0 is the minimum energy (exposure) per unit area of the film required for an object to be properly