

grows exponentially where a linear number of tests is sufficient.

As the algorithm developed by Yau and Yang in [3] is claimed by the authors to be about as complex as the Bossen and Hong algorithm *NR* "and yet the number of tests in a test set generated will always be smaller for redundant circuits and the same for irredundant circuits as that generated by Bossen and Hong algorithm for irredundant circuits" (i.e., algorithm *NR*), we may reach the following conclusion.

CONCLUSION

The Bossen and Hong algorithms *G* and *NR* in [2] and the algorithm of Yau and Yang in [3] generate for a class of *n*-input networks a complete test set with a number of tests which grows exponentially with *n* where a complete test set with no more than *n* + 2 tests may be found. Hence these algorithms will not always generate a "near-minimal" or "near-optimal" number of tests in a useful sense of these notions.

The same conclusion must be drawn for the algorithm shown by Gosh in [4], which generates at least as many tests as algorithm *NR*.

On the other hand, it should be noted that the algorithms in [2]-[4] are computationally the simplest yet discovered, so that for networks with few input lines they may generate acceptable complete though not necessarily small multiple fault detection test sets in a short time.

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Author's Reply²

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We agree with Coy's observation. There exists a class of networks where the cause-effect algorithm [1] produces nowhere near minimal number of test patterns. We also agree with Coy that for practical computational reasons perhaps the cause-effect approach is the best bet for the so-called "random" combinational logic networks. For the EXCLUSIVE-OR trees we suspect that many near minimal single fault testing algorithms may exhibit nonminimality in the same manner.

REFERENCES

[1] D. C. Bossen and S. J. Hong, "Cause-effect analysis for multiple fault detection in combinational networks," *IEEE Trans. Comput.*, vol. C-20, pp. 1252-1257, Nov. 1971.

² Manuscript received September 20, 1978; revised December 15, 1979. The authors are with the IBM Corporation, Poughkeepsie, NY 12602.

Correction to "Properties of the Multidimensional Generalized Discrete Fourier Transform"

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The following typographical errors should be noted in the above paper.¹

- 1) On p. 820, first column, 21st row:

where $z = 0, 1, \dots, T - 1$, be two vectors of *T* complex

- 2) On p. 820, second column, 5th row:

(where $n_u, k_u = 0, 1, \dots, N_u^{-1}$ for $u = 1, 2, \dots, \sigma$) be,

- 3) On p. 820, second column, 12th row:

$$h_{k_1, k_2, \dots, k_\sigma}^\sigma = \sum_{n_\sigma=0}^{N_\sigma-1} \left(\dots \left(\sum_{n_2=0}^{N_2-1} \left(\sum_{n_1=0}^{N_1-1} f_{n_1, n_2, \dots, n_\sigma}^\sigma W[N_1]^{(n_1+a_1^i)(k_1+b_1^i)} \right) \right) \right) W[N_2]^{(n_2+a_2^i)(k_2+b_2^i)} \dots W[N_\sigma]^{(n_\sigma+a_\sigma^i)(k_\sigma+b_\sigma^i)}$$

- 4) On p. 820, second column, 28th row:

$$\{d[i + 1]^\sigma k_1^*, \dots, k_{i-1}^*, k_i, n_{i+1}^*, \dots, n_\sigma^*\}, k_i = 0, 1, \dots, N_{i-1}$$

- 5) On p. 826, first column, 14th row:

$$\text{if: a) } N_{\gamma_s+1} N_{\gamma_s+2} \dots N_{\gamma_s+1} = T_s, \dots$$

- 6) On p. 826, first column, 29th row:

$$b_{\gamma_s+u}^\sigma = \begin{cases} b_s^\sigma & \text{if } u = 1 \\ 0 & \text{if } 1 < u \leq \gamma_{s+1} - \gamma_s \end{cases}$$

- 7) On p. 826, first column, 36th row:

$$T_s = N_{\gamma_s+1} N_{\gamma_s+2} \dots N_{\gamma_s+1}, \dots$$

- 8) On p. 826, second column, 18th row:

$$\text{that: a) } T_s = P_{\nu_s+1} P_{\nu_s+2} \dots P_{\nu_s+1}, \dots$$

- 9) On p. 827, second column, 31st row:

$$W[N_{\gamma_s+1}]^{(n_{\gamma_s+1}+a_{\gamma_s+1}^\sigma)(k_{\gamma_s+1}+b_{\gamma_s+1}^\sigma)} \dots W[N_{\gamma_s+1}]^{(n_{\gamma_s+1}+a_{\gamma_s+1}^\sigma)(k_{\gamma_s+1}+b_{\gamma_s+1}^\sigma)}$$

- 10) On p. 828, first column, 4th row:

$$= \sum_{t_\alpha=0}^{T_\alpha-1} \left(\dots \left(\sum_{t_2=0}^{T_2-1} \left(\sum_{t_1=0}^{T_1-1} e_{t_1, t_2, \dots, t_\alpha}^\alpha W[T_1]^{(t_1+a_1^q)(z_1+b_1^q)} \right) \right) \right)$$

- 11) On p. 828, second column, 3rd row:

... and $\Phi^{\alpha'}$ and ...

- 12) On p. 828, second column, 28th row:

$$t_s = \sum_{u=\nu_s+1}^{\nu_{s+1}} \left[\sum_{x=\delta_u+1}^{\delta_{u+1}} \left(\prod_{y=x+1}^{\delta_{u+1}} N_y \right) \left(\prod_{\nu=\delta_u+1}^{\delta_{\nu+1}+1} N_\nu \right) \right] n_x = \sum_{x=\delta_{\nu_s+1}+1}^{\delta_{\nu_{s+1}+1}+1} \left(\prod_{y=x+1}^{\delta_{\nu_{s+1}+1}+1} N_y \right) n_x \quad (14)$$

- 13) On p. 829, first column, 14th row:

$$\cdot W[N_{\delta_{i+1}}]^{(n_{\delta_{i+1}}+a_{\delta_{i+1}}^\sigma)(k_{\delta_{i+1}}+b_{\delta_{i+1}}^\sigma)} \quad (16)$$

- 14) On p. 829, second column, 17th row:

$$e[1](p_2^*, \dots, p_\tau^*)_{p_1, \dots, p_{\lambda_1}}^r = f_{p_1, p_2, \dots, p_\tau}^r$$

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¹ P. Corsini and G. Frosini, *IEEE Trans. Comput.*, vol. C-28, pp. 819-830, Nov. 1979.