A BALANCED INCOMPLETE BLOCK DESIGN

By Haim Hanani

Israel Institute of Technology

We construct here a balanced incomplete block design with parameters $k = 5$, $\lambda = 1$, $v = 141$. This supplements [1], whose definitions and notation are maintained.

Elements: (i, j, h), $(i = 0, 1, \cdots, 6; j = 0, 1, 2, 3, 4; h = 0, 1, 2, 3)$ and (A).

Blocks: For every i, form B [5, 1, 21] on the set $\{(A), (i, j, h): j = 0, 1, 2, 3, 4; h = 0, 1, 2, 3\}$. Further construct the following blocks:

$$\{(i, j+3, 1), (i+3^n, j, 0), (i+3^{n+1}, j+1, 0), (i+3^{n+3}, j, 1), (i+3^{n+4}, j+1, 0)\},$$

$$\{(i, j+3, 0), (i+3^n, j, 2), (i+3^{n+1}, j+1, 0), (i+3^{n+3}, j, 3), (i+3^{n+4}, j+1, 2)\},$$

$$\{(i, j+3, 2), (i+3^n, j, 1), (i+3^{n+1}, j+1, 1), (i+3^{n+3}, j, 2), (i+3^{n+4}, j+1, 1)\},$$

$$\{(i, j+3, 1), (i+3^n, j, 3), (i+3^{n+1}, j+1, 1), (i+3^{n+3}, j, 0), (i+3^{n+4}, j+1, 3)\},$$

$$\{(i, j+3, 3), (i+3^n, j, 1), (i+3^{n+1}, j+1, 2), (i+3^{n+3}, j, 0), (i+3^{n+4}, j+1, 2)\},$$

$$\{(i, j+3, 0), (i+3^n, j, 3), (i+3^{n+1}, j+1, 2), (i+3^{n+3}, j, 2), (i+3^{n+4}, j+1, 0)\},$$

$$\{(i, j+3, 2), (i+3^n, j, 2), (i+3^{n+1}, j+1, 3), (i+3^{n+3}, j, 1), (i+3^{n+4}, j+1, 3)\},$$

$$\{(i, j+3, 3), (i+3^n, j, 0), (i+3^{n+1}, j+1, 3), (i+3^{n+3}, j, 3), (i+3^{n+4}, j+1, 1)\},$$

$$n = 0, 2, 4.$$

As a consequence, Footnotes 2, 3, 6, 7 of [1] may be omitted and (7.10) may be reworded as follows: If $v \equiv 1$ or $5 \pmod{20}$, then $v \varepsilon B(5, 1)$.

REFERENCE

[1] Hanani, Haim (1961). The existence and construction of balanced incomplete block designs. *Ann. Math. Statist.* **32** 361–386.

Received 9 November 1964.

Institute of Mathematical Statistics is collaborating with JSTOR to digitize, preserve, and extend access to *The Annals of Mathematical Statistics.* www.jstor.org