

As a text for presenting an abstract development the book should do very well. As a reference book for the numerical analyst who needs to look up something about matrix theory there are more accessible sources.

Not many misprints were noted, but on p. 123 "the contraction of  $M$ " appears as "the contradiction of  $M$ ."

A. S. H.

**59[G, H, X].**—PAUL A. WHITE, *Linear Algebra*, Dickenson Publishing Co., Inc., Belmont, Calif., 1966, x + 323 pp., 24 cm. Price \$8.50 (Text List), \$11.35 (Trade List).

This is a carefully written, introductory text. It contains all of the material essential to such a text. The subject is introduced concretely, using ordered  $n$ -tuples, after which geometry is done within this context. Abstract, finite-dimensional, vector spaces are then developed, followed by matrices and linear transformations. Attention is paid to congruence and similarity invariants (Jordan forms, minimal polynomials, etc.). The geometric content of the subject is emphasized throughout. The logical structure is clear, since the definition-theorem-proof approach is used. Finally there are many worked-out examples, as well as a varied selection of exercises.

One apparent bonus at this level, is the introduction of the exterior product  $\mathbf{u}_1 \wedge \cdots \wedge \mathbf{u}_k$ , for  $\mathbf{u}_i \in V$ , an  $n$ -dimensional space. Unfortunately, in this reviewer's opinion, this noble attempt fails. First, the definition is very much dependent on coordinates, hence highly computational and unmotivated. Next, the definition is not standard, nor even unique, since if  $\mathbf{e}_1, \dots, \mathbf{e}_n$  is the usual basis in coordinate space,  $\mathbf{e}_{i_1} \wedge \cdots \wedge \mathbf{e}_{i_k}$  ( $i_1 < \cdots < i_k$ ) is defined only up to a multiplicative constant  $c_{i_1 \dots i_k}$ , which leads to complications when the author speaks of "the" exterior product. Furthermore, the author (uncharacteristically) neglects to state  $c_{i_1 \dots i_k} \neq 0$ —clearly required if the usual results on linear dependence are to hold.

According to the author, the book follows the CUPM recommendations for a linear algebra course. The material has been used in NSF Institutes and in regular undergraduate classes, and despite the above objection, it is easy to believe that it proved highly successful.

MELVIN HAUSNER

New York University  
Courant Institute of Mathematical Sciences  
New York, New York 10012

**60[K].**—M. J. ALEXANDER & C. A. VOK, *Tables of the Cumulative Distribution of Sample Multiple Coherence*, Research Report RR 63-37, Rocketdyne Division of North American Aviation, Inc., Canoga Park, Calif., November 1963, nine volumes totalling 5440 pp., 32 cm. Price \$50.00 (not postpaid).

The multiple coherence parameter plays a role in spectral analysis of multi-dimensional time series analogous to that of the squared multiple correlation coefficient in multivariate analysis. In fact, these tables can be used for the latter under the conditions described below.