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Linear Systems of Equations Solved Using Mathematical Algorithms

A new mathematical algorithm has been developed for the solution of linear systems of equations, $AX = B$, which preserves the integer properties of the coefficients. The algorithms presented can also be used for the efficient evaluation of determinates and their leading minors.

The methods described are computationally more efficient than the corresponding single-step Gaussian elimination technique currently being used. In addition, the magnitude of the coefficients in the transformed matrices is minimized. The algorithms have universal applicability for solving linear equations and are particularly adaptable to digital computer techniques.

Notes:

1. This information was reported in ANL Report 7213, "Multistep Integer-Preserving Gaussian Elimination," Argonne National Laboratory, by E. Bareiss of the Applied Mathematics Division. Explicit algorithms and flow charts for the two-step method are presented in the report. The report is available from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151; price $3.00 (microfiche $0.65).

2. See also: Erwin H. Bareiss, "Sylvester's Identity and Multistep Integer-Preserving Gaussian Elimination," *Math. Comp.*, July 1968 (to appear).

3. Inquiries concerning this report may be directed to:
   Office of Industrial Cooperation
   Argonne National Laboratory
   9700 South Cass Avenue
   Argonne, Illinois 60439
   Reference: B68-10292

   Source: E. H. Bareiss
   Applied Mathematics Division
   (ARG-10146)

Patent status:

Inquiries about obtaining rights for commercial use of this innovation may be made to:
   Mr. George H. Lee, Chief
   Chicago Patent Group
   U.S. Atomic Energy Commission
   Chicago Operations Office
   9800 South Cass Avenue
   Argonne, Illinois 60439

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