

GAUSS.8xp

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This program will use Gauss Jordan to solve or simplify a system of linear equations. This program does not require the matrix to be invertible. The user will first input the entire matrix into matrix A in the calculator. They will then call the Gauss program which will ask if the matrix is in A and then ask the dimensions of the coefficient matrix as 2 x 2, 3 x 3, or 4 x 4. The program will simplify the left side into the identity matrix as much as possible. It uses the row functions built into the matrix operations. It will first try to make the values along the diagonal one. It will then use the multiply then add row function to make the other values in each column other than the diagonal to zero. If you get the identity matrix and then one column on the right, this column is the solution to the system. However if it does not simplify to the identity, it will go as far as it can. For example,

$$Ax + By + Cz = D$$

given system $Ex + Fy + Gz = H$, you will input it into matrix A as

$$Jx + Ky + Lz = M$$

$$\begin{bmatrix} A & B & C & D \\ E & F & G & H \\ J & K & L & M \end{bmatrix}$$
 which the program will try, if possible to simplify to

$$\begin{bmatrix} 1 & 0 & 0 & D' \\ 0 & 1 & 0 & H' \\ 0 & 0 & 1 & M' \end{bmatrix}$$
 which will then print this matrix and $D' = x$, $H' = y$,

$M' = z$. If the matrix cannot be reduced to identity form, the answer will need to be parameterized or the user will need to use back substitution to find answer. If this happens, the user needs to know how to interpret matrices after Gauss Jordan.