

SOLUTIONS OF LINEAR SYSTEMS

basic variable:

any variable that corresponds to a pivot column in the augmented matrix of a system.

free variables:

all nonbasic variables.

EXAMPLE 4'

$$\begin{bmatrix} 1 & 6 & 0 & 3 & 0 & 0 \\ 0 & 0 & 1 & -8 & 0 & 5 \\ 0 & 0 & 0 & 0 & 1 & 7 \end{bmatrix} \quad \begin{array}{rcl} x_1 + 6x_2 & + 3x_4 & = 0 \\ & x_3 - 8x_4 & = 5 \\ & & x_5 = 7 \end{array}$$

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pivot columns: 1, 3, 5 basic variables: x_1, x_3, x_5

free variables: x_2 and x_4

Final Step in Solving a Consistent Linear System

After the augmented matrix is in **reduced** echelon form and the system is written down as a set of equations:

Solve each equation for the basic variables in terms of the free variables (if any) in the equation.