

## Reading Assignment

Read Chapters 9-12.

## Problem #1: System of Equations

Solve the following system of equations using just algebraic substitution (i.e., no matrices, Cramer's rule, etc.).

$$a - b + c = 2 \quad (1)$$

$$3a + 2b + c = 16 \quad (2)$$

$$-3a - 2b + c = -16 \quad (3)$$

## Problem #2: Solution Using Linear Algebra

Do the following by hand:

- Write Eqs. (1)-(3) in matrix form.
- Calculate the inverse of the coefficient matrix  $[A]$  using the Gauss-Jordan method.
- Calculate the unknown terms using matrix multiplication  $[A]^{-1}[b]$ .

## Problem #3: Write a MATLAB Program to Calculate $[A]^{-1}$

Write a computer program in MATLAB that implements the Gauss-Jordan method to calculate a matrix inverse. The program should be able to handle a square matrix of any size. Use it to calculate the inverse in Problem 2. Show the result generated in MATLAB.

## Problem #4: Matrix Algebra

Solve the following matrix equation for  $[A]$  and simplify as much as possible.

$$[I] = \left\{ \left( [B]^{-1} \right)^T [D] + [I] \right\} \left\{ \left( [A]^{-1} \right)^T [C]^T [D] + [I] \right\}^{-1}$$