Physics 201

Problem Set (2)

Problem (1)

1. In each part, determine whether the matrix is in row echelon form, reduced row echelon form, both, or neither.

(a) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

(b) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 0 \end{bmatrix}$

(c) $\begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & 0 & 0 \end{bmatrix}$

(d) $\begin{bmatrix} 1 & 0 & 3 & 1 \\ 0 & 1 & 2 & 4 \end{bmatrix}$

(e) $\begin{bmatrix} 1 & 2 & 0 & 3 & 0 \\ 0 & 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$

(f) $\begin{bmatrix} 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$

(g) $\begin{bmatrix} 1 & -7 & 5 & 5 \\ 0 & 1 & 3 & 2 \end{bmatrix}$

Problem (2)

Use Gauss-Jordan elimination to solve the linear system

$$
\begin{aligned}
x + y + z &= 3 \\
2x + 3y + 4z &= 11 \\
4x + 9y + 16z &= 41
\end{aligned}
$$

Problem (3)

Use Gaussian elimination to solve the system of linear equations

$$
\begin{aligned}
x_1 - 2x_2 - 6x_3 &= 12 \\
2x_1 + 4x_2 + 12x_3 &= -17 \\
x_1 - 4x_2 - 12x_3 &= 22.
\end{aligned}
$$

Problem (4)

Solve the system of linear equations.

$$
\begin{aligned}
2x_1 + 4x_2 - 2x_3 &= 0 \\
3x_1 + 5x_2 &= 1
\end{aligned}
$$

Problem (5)

Use Gauss-Jordan elimination to solve the homogeneous linear system

$$
\begin{aligned}
x_1 + 3x_2 - 2x_3 \qquad + 2x_5 \qquad &= 0 \\
2x_1 + 6x_2 - 5x_3 - 2x_4 + 4x_5 - 3x_6 &= 0 \\
5x_3 + 10x_4 \qquad + 15x_6 &= 0 \\
2x_1 + 6x_2 \qquad + 8x_4 + 4x_5 + 18x_6 &= 0
\end{aligned}
$$