

WOLLO UNIVERSITY COLLEGE OF NATURAL SCIENCE
PHYSICS DEPARTMENT
ASSIGNMENT I ON MATHEMATICAL METHODS OF PHYSICS II
(Phys 2032)
10%

Answer the following questions accordingly

1. Solve the following system of equations using,
 - (a) Gauss elimination method.
 - (b) matrix inversion method.

$$\begin{aligned}3x - 2y + 2z &= 3 \\x + 2y + -3z &= 7 \\x + y + 2z &= 12\end{aligned}$$

2. For two vectors

$$\vec{A} = 5i + 4j + 2k, \quad \text{and} \quad \vec{B} = 4i - 5j + 3k$$

determine,

- (a) the angle between them using direction cosines.
 - (b) the angle, $\vec{C} = \vec{A} \times \vec{B}$, makes with $\vec{A}$ and $\vec{B}$ using direction cosines.
3. For the matrix $A = \begin{pmatrix} 5 & 7 & -5 \\ 0 & 4 & -1 \\ 2 & 8 & -3 \end{pmatrix}$
 - (a) Find the eigenvalues of A.
 - (b) Find the corresponding normalized eigenvectors.
4. Find the transformation matrices for rotations about
 - (a) x - axis
 - (b) y -axis
 - (c) z - axis

with an angle θ in a clockwise direction as viewed from the positive x, y and z axes respectively.