

STUDY GUIDE FOR MAS 2103 MID-TERM EXAM

Be able to do each of the following:

1. Solve a system of equations by Gauss elimination and back-substitution.
2. Solve a system of equation by Gauss-Jordan elimination.
3. Use Gauss-Jordan elimination to find A^{-1} , starting with the augmented matrix $[A|I]$.
4. Identify the elementary row operations used in solving a system of equations.
5. Write down the elementary matrices E_1, E_2, \dots, E_n such that $E_n, \dots, E_2E_1A = I$.
6. Give $A^{-1} = E_n \dots E_2E_1$ and $A = E_1^{-1}E_2^{-1} \dots E_n^{-1}$ as products of elementary matrices.
7. Evaluate the determinant of a matrix A by a cofactor expansion along any row or column. Know the relationship between the determinant of a matrix and the existence of the inverse of a matrix.
8. Find the norm of a vector.
9. Find the dot product and cross product between two vectors.
10. Find the cosine of the angle and sine of the angle between two vectors.
11. Show that two vectors are orthogonal.
12. Find the equation of the plane passing through a point where the plane has a normal vector.
13. Perform compositions of linear transformations, including reflection, projection, rotation, contraction, and dilation.
14. Justify whether a linear operator is one-to-one.
15. Find the standard matrix for a linear operator T from the images of the standard basis vectors.