INF 1004 Mathematics 2
Tutorial Save My Grades

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Question 1

Remove vector $u = (-1, 3, -4, 2)$ from vector $v = (-2, 2, 2, 5, 6)$

My Solution

Question 2

Note the difference in the order between remove from and project onto.
Project vector $u = (-1, 3, -4, 2)$ onto vector $v = (3, -3, -1, 1)$

My Solution

Question 3

$$x + 4y + 2z = 5.5$$
$$-5x - 22y - 5z = -45.5$$
$$2x + 4z + 14z = -25$$

- Show as an itermediate step the augmented matrix when for the first time the zeroth coulmn became a one-hot vector after performing transformations
- Show as an intermediate step the augmented matrix when for the first time the augmented matrix is in row echelon form.
- Write the set of all solutions as a single vector or a combination of vectors, None if there is no solution

My Solution

Question 4

$$x + 3y - 5z = 2.75$$
$$3x + 12y - 13z = -9.75$$
$$-4x - 6z + 25z = -46.25(\text{might be -6y})$$

- Show as an itermediate step the augmented matrix when for the first time the zeroth coulmn became a one-hot vector after performing transformations
- Show as an intermediate step the augmented matrix when for the first time the augmented matrix is in row echelon form.
- Write the set of all solutions as a single vector or a combination of vectors, None if there is no solution

My Solution

Question 5

Compute the inverse of

$$A_0 = \begin{bmatrix} 9 & -2 \\ 3 & -4 \end{bmatrix}$$

$$A_1 = \begin{bmatrix} 10 & 3 \\ 8 & 4 \end{bmatrix}$$

Use these inverses to Solve

$$A_0 x = \begin{bmatrix} 1 \\ -2 \end{bmatrix}$$

$$A_1 x = \begin{bmatrix} -7 \\ 4 \end{bmatrix}$$

- Are they invertible?
- Which of them has full rank? WHich one of them has lower rank and which one?

My Solution

Question 6

Compute the determinant of

$$A = \begin{bmatrix} 3 & -1 & 4 \\ 5 & 2.5 & 3 \\ 1 & 8 & -6 \end{bmatrix}$$

$$A = \begin{bmatrix} 3 & -2 & 0.5 \\ 2.5 & -3 & 1 \\ 3 & 2 & 4 \end{bmatrix}$$

$$A = \begin{bmatrix} 2 & -2 & 2 \\ 8 & 3 & -2 \\ 10 & -4.5 & 5 \end{bmatrix}$$

My Solution

Question 7

What is the determinant of this matrix? Write it as a polynomial in c.
For what value c the matrix is not invertible?

$$A = \begin{bmatrix} 6 & -3 & c \\ 5 & 2 & 2 \\ -2 & -6 & -2 \end{bmatrix}$$

My Solution

Question 8

Compute and apply the Householder matrix which makes transforms the first column of A to a multipile of the first one-hot vector for

$$A = \begin{bmatrix} 8 & 1 & 2 \\ 4 & -1 & 3 \\ -8 & 4 & 2 \end{bmatrix}$$

and for (Subtracting is nicer)

$$A = \begin{bmatrix} 3 & -4 & 3 \\ \sqrt{2} & 6 & 4 \\ \sqrt{5} & 3 & 2 \end{bmatrix}$$