

## MS 120 Guass-Jordan Extra Problems

1. Solve

$$\begin{cases} x_1 + 3x_2 + 2x_3 + 2x_4 = 3 \\ x_1 + x_2 + 3x_3 = 4 \\ 2x_1 + 2x_3 - 3x_4 = 4 \\ x_1 - 3x_2 = 1 \end{cases}$$

- a) Find the coefficient matrix.      b) Find the constant vector.      c) Find the augmented matrix.

Let A be the coefficient matrix.

```
julia> det(A)
50.0
```

Let Aug be the augmented matrix, in reduced row echelon form it is:

```
julia> rref(Aug)
4×5 Matrix{Float64}:
1.0  0.0  0.0  0.0  1.0
0.0  1.0  0.0  0.0  0.0
0.0  0.0  1.0  0.0  1.0
0.0  0.0  0.0  1.0  0.0
```

(d) Is the system inconsistent/consistent/independent/dependent.

(e) How many solutions does this system have?

(f) What are they? If more than one also give two specific solutions.

2. Solve

$$\begin{cases} x_1 + 2x_2 - x_3 + x_4 = 2 \\ x_1 + 3x_2 + 4x_3 + x_4 = -4 \\ 2x_1 + 5x_2 + 2x_3 + 2x_4 = 1 \\ 2x_1 + 3x_2 - 6x_3 + 2x_4 = 2 \end{cases}$$

- a) Find the coefficient matrix.      b) Find the constant vector.      c) Find the augmented matrix.

Let A be the coefficient matrix.

```
julia> det(A)
0.0
```

Let Aug be the augmented matrix, in reduced row echelon form it is:

```
julia> rref(Aug)
4×5 Matrix{Float64}:
1.0  0.0  0.0  1.0  0.0
0.0  1.0  0.0 -0.0  0.0
0.0  0.0  1.0  0.0  0.0
0.0  0.0  0.0  0.0  1.0
```

(d) Is the system inconsistent/consistent/independent/dependent.

(e) How many solutions does this system have?

(f) What are they? If more than one also give two specific solutions.

3. Solve

$$\begin{cases} x_1 + 3x_2 + 4x_3 - x_4 = 1 \\ x_1 - x_2 - 2x_3 + x_4 = 3 \\ x_1 + 2x_2 + 3x_3 + x_4 = 0 \\ 2x_1 + 2x_2 + 2x_3 = 4 \end{cases}$$

- a) Find the coefficient matrix.      b) Find the constant vector.      c) Find the augmented matrix.

Let A be the coefficient matrix.

```
julia> det(A)
0.0
```

Let Aug be the augmented matrix, in reduced row echelon form it is:

```
julia> rref(Aug)
4×5 Matrix{Float64}:
1.0  0.0  0.0  2.0  1.0
0.0  1.0  0.0 -5.0  4.0
0.0  0.0  1.0  3.0 -3.0
0.0  0.0  0.0  0.0  0.0
```

(d) Is the system inconsistent/consistent/independent/dependent.

(e) How many solutions does this system have?

(f) What are they? If more than one also give two specific solutions.