$$A = \begin{pmatrix} A1 & B1 & C1 & D1 \\ A2 & B2 & C2 & D2 \\ A3 & B3 & C3 & D3 \\ A4 & B4 & C4 & D4 \end{pmatrix}$$

$$\rightarrow \begin{pmatrix} 2 & -1 & 1 & 3 \\ -1 & 1 & 1 & -1 \\ 3 & 1 & 9 & 0 \\ 2 & -3 & -5 & -1 \end{pmatrix}$$

$m1 = \text{ReducedRowEchelonForm}(A)$

$$\rightarrow \begin{pmatrix} 1 & 0 & 2 & 0 \\ 0 & 1 & 3 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 \end{pmatrix}$$

No Solutions. There fore the vector (3,-1,0,-1) doesnt exists in the subspace spanned by $\alpha\dot{}1$, $\alpha\dot{}2$, $\alpha\dot{}3$

| | A | B | C | D |
|---|---|---|---|---|
| 1 | 2 | -1 | 1 | 3 |
| 2 | -1 | 1 | 1 | -1 |
| 3 | 3 | 1 | 9 | 0 |
| 4 | 2 | -3 | -5 | -1 |
| 5 | | | | |
| 6 | Question 1 | | | |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | |
| 10 | | | | |
| 11 | | | | |
| 12 | | | | |
| 13 | | | | |
| 14 | | | | |
| 15 | | | | |
| 16 | | | | |

$$m1 = \begin{pmatrix} A1 & B1 & C1 & D1 \\ A2 & B2 & C2 & D2 \\ A3 & B3 & C3 & D3 \\ A4 & B4 & C4 & D4 \end{pmatrix}$$

$$\rightarrow \begin{pmatrix} 1 & 1 & 2 & 4 \\ 2 & -1 & -5 & 2 \\ 1 & -1 & -4 & 0 \\ 2 & 1 & 1 & 6 \end{pmatrix}$$

$$m2 = \text{ReducedRowEchelonForm}(m1)$$

$$\rightarrow \begin{pmatrix} 1 & 0 & -1 & 2 \\ 0 & 1 & 3 & 2 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{pmatrix}$$

$$m3 = \begin{pmatrix} A7 & B7 & C7 & D7 \\ A8 & B8 & C8 & D8 \end{pmatrix}$$

$$\rightarrow \begin{pmatrix} 1 & 1 & 2 & 4 \\ 2 & -1 & -5 & 2 \end{pmatrix}$$

$$l1 = \text{Dimension}(m3)$$

$$\rightarrow \{2, 4\}$$

$$a = \text{MatrixRank}(m3)$$

$$\rightarrow 2$$

| | A | B | C | D |
|---|---|---|---|---|
| 1 | 1 | 1 | 2 | 4 |
| 2 | 2 | -1 | -5 | 2 |
| 3 | 1 | -1 | -4 | 0 |
| 4 | 2 | 1 | 1 | 6 |
| 5 | | | | |
| 6 | | | | |
| 7 | 1 | 1 | 2 | 4 |
| 8 | 2 | -1 | -5 | 2 |
| 9 | | | | |
| 10 | Question 2 | | | |
| 11 | | | | |
| 12 | | | | |
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| 25 | | | | |

$w(t) = 2\,t^3 - 4\,t^2 + 9\,t + 5$

$v(t) = t^3 - t^2 + 8\,t + 2$

$u(t) = t^3 - 3\,t^2 + 5\,t + 1$

$$A = \begin{pmatrix} A1 & B1 & C1 & D1 \\ A2 & B2 & C2 & D2 \\ A3 & B3 & C3 & D3 \end{pmatrix}$$

$$\rightarrow \begin{pmatrix} 1 & -3 & 5 & 1 \\ 1 & -1 & 8 & 2 \\ 2 & -4 & 9 & 5 \end{pmatrix}$$

m1 = ReducedRowEchelonForm(A)

$$\rightarrow \begin{pmatrix} 1 & 0 & 0 & 7.25 \\ 0 & 1 & 0 & 1.25 \\ 0 & 0 & 1 & -0.5 \end{pmatrix}$$

U = 7.25

-5 — 10

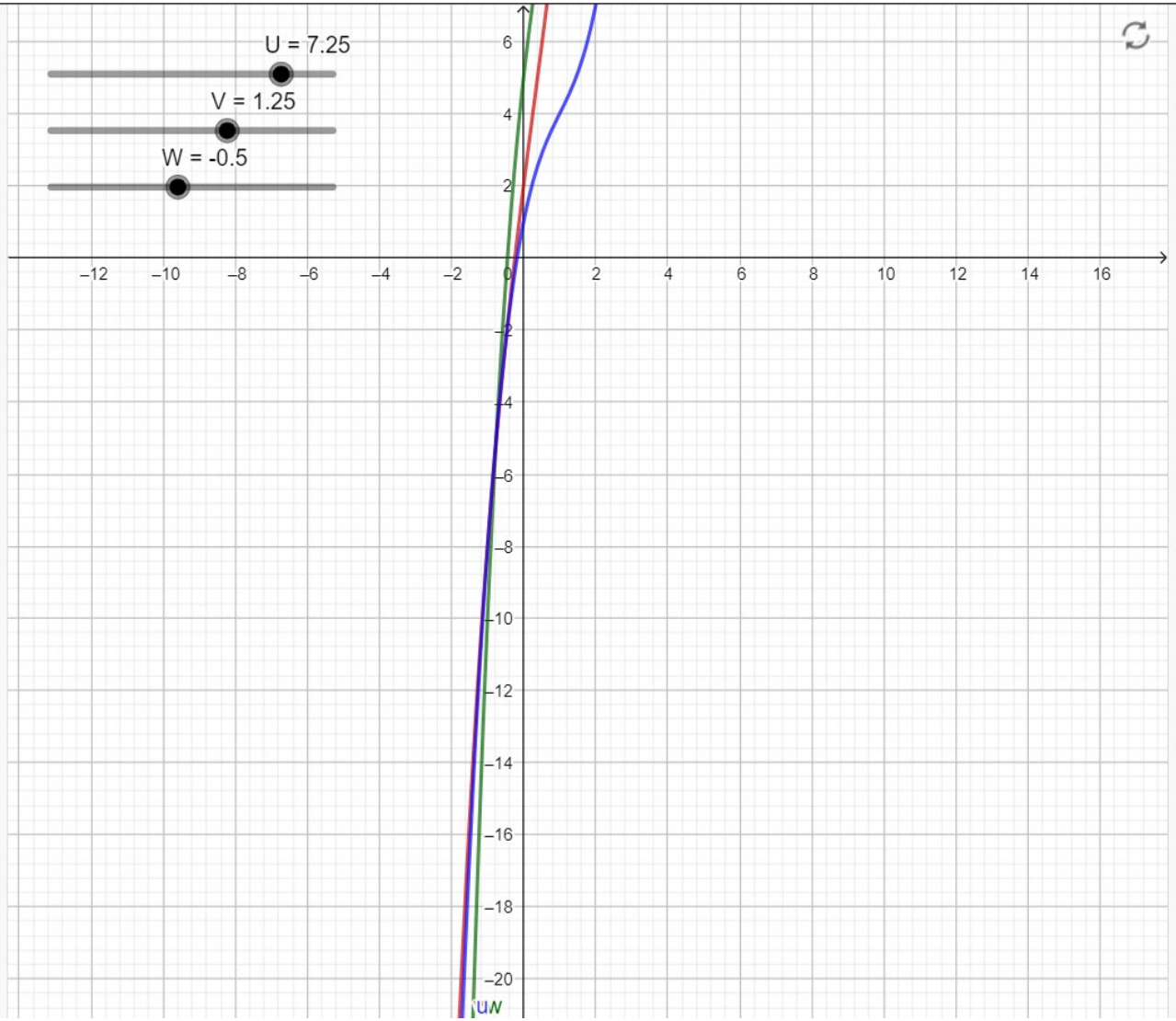
V = 1.25

-5 — 5

W = -0.5

-5 — 5

Number of free variables = 0




| | A | B | C |
|---|---|---|---|
| 1 | 1 | -3 | 5 |
| 2 | 1 | -1 | 8 |
| 3 | 2 | -4 | 9 |
| 4 | | | |
| 5 | Question 3 | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
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