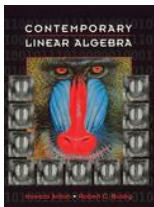Chapter 3, Section 2 of *Contemporary Linear Algebra* by Anton and Busby



Next Page

1. Find a matrix $X$ that satisfies $SX = TU$, where

$$S = \begin{pmatrix} 5 & 2 \\ 2 & 1 \end{pmatrix} \quad T = \begin{pmatrix} -2 & 0 \\ 2 & 1 \end{pmatrix}, \quad \text{and} \quad U = \begin{pmatrix} 3 & 6 \\ 1 & -2 \end{pmatrix}.$$

▶ A

$$\begin{pmatrix} -6 & -12 \\ 7 & 10 \end{pmatrix}$$

▶ B

$$\begin{pmatrix} -6/5 & -6 \\ 7/2 & 10 \end{pmatrix}$$

▶ C

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

▶ D

$$\begin{pmatrix} -20 & -32 \\ 47 & 74 \end{pmatrix}$$

▶ E

$$\begin{pmatrix} 10 & 12 \\ 7 & -6 \end{pmatrix}$$

2. Simplify $(P - Q^{-1})(P^{-1}Q^{-1} + QP)(P^{-1} + Q)$, where $P$ and $Q$ are $n \times n$ invertible matrices.

- ▸A $(P + Q)(P - Q)$
- ▸B $(PQ)^2 - (PQ)^{-2}$
- ▸C $0$
- ▸D $(I + P + Q)^{-1}$
- ▸E $I$

Next Question

3. Given $p(x) = 1 + x - 2x^2$, find $p(M)$ where

$$M = \begin{pmatrix} 2 & 1 & -1 \\ 0 & -1 & 4 \\ 1 & 5 & -2 \end{pmatrix}$$

▸ A
$$\begin{pmatrix} -3 & 9 & -9 \\ -8 & -42 & 28 \\ 1 & 33 & -47 \end{pmatrix}$$
▸ B
$$\begin{pmatrix} -15 & -57 & 57 \\ 12 & 174 & 216 \\ -45 & -267 & 225 \end{pmatrix}$$

▸ C
$$\begin{pmatrix} -5 & 0 & -2 \\ 1 & -2 & -27 \\ 0 & -44 & -9 \end{pmatrix}$$
▸ D
$$\begin{pmatrix} -3 & 10 & -8 \\ -7 & -42 & 29 \\ 2 & 34 & -47 \end{pmatrix}$$

▸ E
$$\begin{pmatrix} 9 & -7 & 7 \\ 8 & 42 & -20 \\ 1 & -23 & 45 \end{pmatrix}$$

4. If an $n \times n$ matrix $W$ satisfies $4W^4 + 3W^3 + 2W^2 + W + I = 0$ then $W$ is invertible and

- ▸A  $W^{-1} = 5W^5$
- ▸B  $W^{-1} = I + W + \frac{1}{2}W^2 + \frac{1}{3}W^3 + \frac{1}{4}W^4$
- ▸C  $W^{-1} = I + W + W^2 + W^3 + W^5$
- ▸D  $W^{-1} = -(W - I)(W - 2I)(W - 3I)(W - 4I)$
- ▸E  $W^{-1} = -4W^3 - 3W^2 - 2W - I$

Next Question

5. Find $N^6$, where

$$N = \begin{pmatrix} 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 \end{pmatrix}$$

- A   $N$
- B   $I$
- C   $I - N$
- D   $0$
- E   $6N$

No more questions

RIGHT!

Back

Wrong...try again

Back