Property DSAC \((\alpha + \beta)u = \alpha u + \beta u\)

For \(1 \leq i \leq n\)

\[
\overline{[\alpha + \beta]u}_i = (\alpha + \beta)[u]_i \\
= \alpha [u]_i + \beta [u]_i \\
= [\alpha u]_i + [\beta u]_i \\
= [\alpha + \beta u]_i
\]

By Definition \(\text{CVE}\), \((\alpha + \beta)u = \alpha u + \beta u\)

\[\text{Section LC}\]

\[\text{Mon - SS} (\text{Sage})\]

\[\text{The - Problems}\]

\[\text{Theorem} - 3 = 3\]

\[\text{Proof}\]

\[-3 = 3\]

\[(-3)^2 = 3^2\]

\[9 = 9 \checkmark\]
\[
2 \begin{bmatrix} 1 \\ 3 \end{bmatrix} + 4 \begin{bmatrix} -3 \\ 5 \end{bmatrix} = \begin{bmatrix} -10 \\ 26 \end{bmatrix}
\]

"vector" "linear combination"

\[
\begin{align*}
2x_1 + 3x_2 + 6x_3 &= 8 \\
9x_1 + x_2 - 5x_3 &= -2
\end{align*}
\]

vector equality

Theorem SLSLC

Solution to this vector equality true

\[
\begin{align*}
\begin{bmatrix} 2x_1 + 3x_2 + 6x_3 \\ 9x_1 + x_2 - 5x_3 \end{bmatrix} &= \begin{bmatrix} 8 \\ -2 \end{bmatrix} \\
\begin{bmatrix} 2x_1 \\ 9x_1 + x_2 - 5x_3 \end{bmatrix} + \begin{bmatrix} 3x_2 \\ x_2 \end{bmatrix} + \begin{bmatrix} 6x_3 \\ -5x_3 \end{bmatrix} &= \begin{bmatrix} 8 \\ -2 \end{bmatrix}
\end{align*}
\]

\[
x_1 \begin{bmatrix} 2 \\ 9 \end{bmatrix} + x_2 \begin{bmatrix} 3 \\ 1 \end{bmatrix} + x_3 \begin{bmatrix} 6 \\ 5 \end{bmatrix} = \begin{bmatrix} 8 \\ -2 \end{bmatrix}
\]

linear combination
System w/ 5 equations, 7 variables, → PREF

\[
\begin{bmatrix}
1 & 0 & 6 & 0 & -1 & 5 & 0 & -3 \\
0 & 1 & 3 & 0 & 9 & -4 & 0 & 2 \\
0 & 0 & 0 & 1 & 2 & 8 & 0 & 1 \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & 3 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
\end{bmatrix}
\]

\(x_1, x_2, x_3, x_7\) dependent

\(D = \{1, 2, 4, 7\}\)

\(\text{not a pivot} \Rightarrow \text{consistent}\)

\(F = \{3, 5, 6, 8\}\)

\[
\begin{bmatrix}
-3 & -6x_3 & +7x_5 & -5x_6 \\
2 & -3x_3 & -9x_5 & +4x_6 \\
1 & -0x_3 & -2x_5 & -8x_6 \\
3 & -0x_3 & -0x_5 & -0x_6 \\
\end{bmatrix}
\]

\[
\begin{bmatrix}
-3 \\
2 \\
1 \\
3 \\
\end{bmatrix}
\]

\[
\begin{bmatrix}
-6 \\
-3 \\
-9 \\
-7 \\
\end{bmatrix}
\]

\[
\begin{bmatrix}
7 \\
4 \\
0 \\
-5 \\
\end{bmatrix}
\]

\[
\begin{bmatrix}
-6 \\
-3 \\
-9 \\
-7 \\
\end{bmatrix}
\]

\(\Box = \text{"nice pattern of zeros & ones"}\)

\(\text{VFSLS}\)