Exercise 1

22 August 2022 21:21

$$\begin{bmatrix} -1 & -2 & -1 \\ 0 & 0 & 0 \\ 1 & 2 & 1 \end{bmatrix} \rightarrow H$$

$H_1 \times H_2 = H$

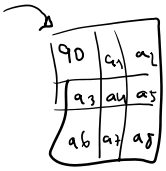
H_1 is 2x2

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix}$$

H_2 is 2x2

$$\begin{bmatrix} e & f \\ g & h \end{bmatrix}$$

H_2 has to be 2x2 as well, so when the slide happens:



We know that row 1 and 3 are opposite, therefore, row 1 and 2 of H_2 are opposite as well.

$$H_2: \begin{bmatrix} e & f \\ -2 & -1 \end{bmatrix}$$

$$ae = -1 \wedge af + be = -2 \wedge bf = -1$$

$$-ae + ce = 0 \wedge -af - be + cf + de = 0 \wedge -bf + df = 0 \Rightarrow \begin{cases} e(-a+c) = 0 \wedge f(-b+d) = 0, \; e \neq 0 \wedge f \neq 0 \\ -ce = 1 \wedge -cf - de = 2 \wedge -df = 1 \end{cases}$$

$$H_1: \begin{bmatrix} a & b \\ a & b \end{bmatrix} \quad a = c \wedge b = d$$

From this we can get that $a = -1/e$, $b = -1/e$, $f = e \rightarrow$ So, for $e = -1$ we get H