# Review, cont'd

Wednesday, October 31, 2018 11:20 AM

example:

$$A = \begin{bmatrix} 1 & 1 & 3 & 1 & 6 \\ 2 & -1 & 0 & 1 & -1 \\ -3 & 2 & 1 & -2 & 1 \\ 4 & 1 & 6 & 1 & 3 \end{bmatrix} \xrightarrow{RREF} \begin{bmatrix} 1 & 0 & 1 & 0 & -1 \\ 0 & 1 & 2 & 0 & 3 \\ 0 & 0 & 0 & 1 & 4 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

row(A): has basis the first three rows of the RREF

col(A): has basis columns 1, 2, and 4 of A

null(A): $A\vec{x} = \vec{0}$

$$x_1 + x_3 - x_5 = 0$$
$$x_2 + 2x_3 + 3x_5 = 0$$
$$x_4 + 4x_5 = 0$$

let $x_3 = s$ and $x_5 = t$

$$\begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \end{bmatrix} = s\begin{bmatrix} \\ \\ \\ \\ \\ \end{bmatrix} + t\begin{bmatrix} \\ \\ \\ \\ \\ \end{bmatrix}$$

these two vectors are a basis for the null space

transformations -

projection operator will be given if needed rotation matrix

- you could be asked to find the matrix that corresponds to a projection / rotation
  - evalate for given vectors
  - first column of A is the effect of that transformation onto $\hat{i}$
  - second is $\hat{j}$
- I can also ask for A for
  - reflection
- for more than one transformation, order matters

first T, then S

$$\underset{\text{matrix } A}{T} \quad \underset{\text{matrix } B}{S}$$

$$(S \circ T)\vec{x} = S(T(\vec{x})) = BA\vec{x}$$