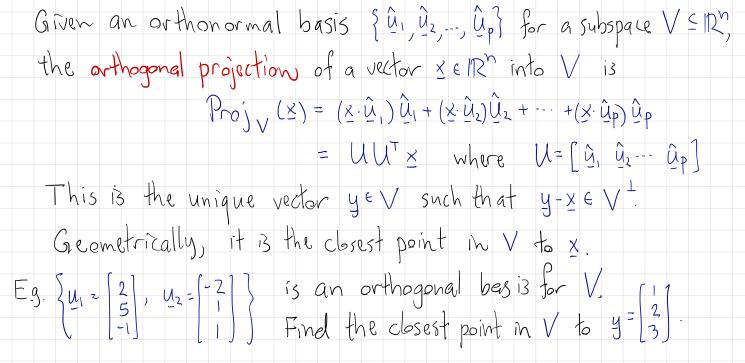
Today § 6.4: Orthogonalization Next: § 7.1: The Spectral Theorem

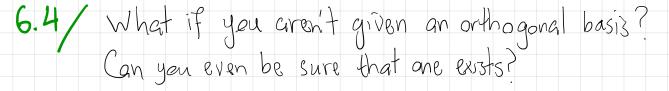
<u>Reminders</u>: Please fill out your CAPEs

My MathLab Homework #8: Due THURSDAY by 11:59pm

MATLAB QUIZ: TOMORROW OR TODAY!

FINAL EXAM: This Saturday, 11:30am-2:30pm Seating / Room Assignment on Triton Ed

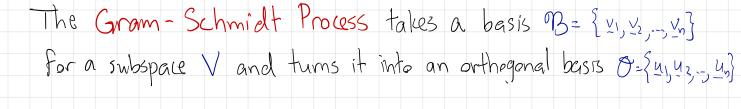




E9.  $V = Nul \left( \begin{array}{c} | | 2 | \\ | - | 0 3 \end{array} \right)$ 

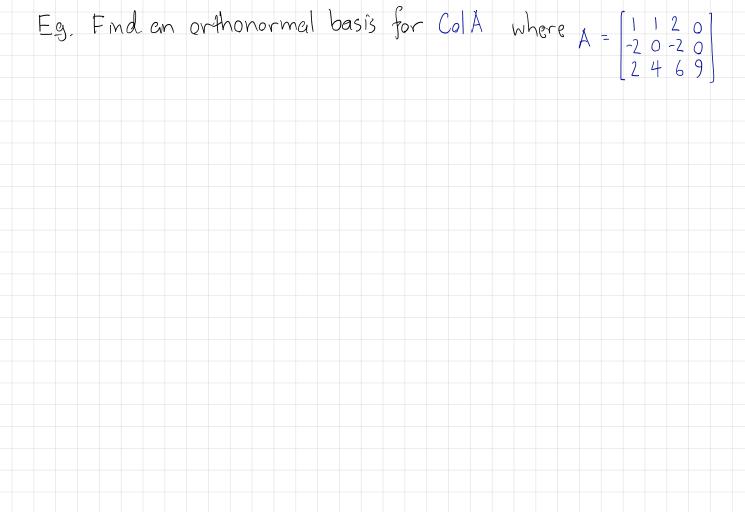
The Gram-Schmidt Orthogonalization Process Given a basis  $\mathcal{B} = \{\underline{v}_1, \underline{v}_2, ..., \underline{v}_p\}$  of a subspace V, we can find a new basis  $\mathcal{O} = \{\underline{u}_1, \underline{u}_2, ..., \underline{u}_p\}$  with the properties:  $\mathcal{D} \mathcal{O}$  is orthogonal

(2) span{V1, 12, -, Vk} = span{u1, 12, -, 4k} for Isksp.



You can then produce an orthonormal basis  $\hat{\Theta} = \{\hat{\mu}_1, \hat{\mu}_2, \dots, \hat{\mu}_n\}$ 

by normalizing.



Question: How can you recover the original vectors { y, yz, yz, ... }

from the new o.n. basis  $\{\hat{u}_1, \hat{u}_2, \hat{u}_3, \dots\}$ ?

Theorem: If A is an man matrix with linearly independent columns, then A has a factorization A = QR  $Q^{T}Q = I \rightarrow Q$ Eg.  $\begin{bmatrix} 1 & 1 & 0 \\ -2 & 0 & 0 \end{bmatrix} = \begin{bmatrix} 1/3 & 0 & -4/3 \\ -2/3 & 1/5 & -2/3 \end{bmatrix} \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$ What is this good for ?