



Department of Mathematics and Natural Sciences

MAT 350

ONLINE ASSIGNMENT 4

FALL 2023

**You have to submit the assignment in a single *nb* file using [this form](#).
Submission Deadline: 11:59 PM, Dec 10, 2023**

1. Consider the matrix $A = \begin{pmatrix} 0 & 0 & -2 \\ 1 & 2 & 1 \\ 1 & 0 & 3 \end{pmatrix}$. Check if A is diagonalizable using RowReduce command.
If it is diagonalizable, Find a matrix P that diagonalizes A . Finally, verify if A is diagonalized by this P by evaluating $P^{-1}AP$.
2. Apply the Gram-Schmidt process on the set of basis vectors $\{u_1, u_2, u_3\}$, where $u_1 = (1, 1, 1)$, $u_2 = (0, 1, 1)$ and $u_3 = (0, 0, 1)$. Hence find the QR decomposition of $A = [u_1|u_2|u_3]$.
3. Find a matrix S that orthogonally diagonalizes $B = \begin{pmatrix} 4 & 2 & 2 \\ 2 & 4 & 2 \\ 2 & 2 & 4 \end{pmatrix}$. Then verify if B is orthogonally diagonalized by this S by evaluating S^TAS .