

## Assignment 2

Due date: 27 October 2023

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1. (30%) Compute the following determinant:

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

2. (40%) Compute the eigenspaces of

a.  $A = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$  (20%)

b.  $B = \begin{bmatrix} -2 & 2 \\ 2 & 1 \end{bmatrix}$  (20%)

3. (10%) Prove that any set of  $n$  orthogonal vectors  $\{\mathbf{v}_1, \mathbf{v}_2, \dots, \mathbf{v}_n\}$  must be an independent set.

4. (20%) Find a Cholesky Factorization of the following matrix

$$\begin{bmatrix} 4 & 6 \\ 6 & 10 \end{bmatrix}.$$