

## Homework #2(Week 3) – MSCA 32010

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$$1. \quad E = \begin{pmatrix} 1 & 0 & 0 \\ -2 & 1 & 0 \\ 4 & -3 & 1 \end{pmatrix} \quad E^{-1} = L = \begin{pmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 2 & 3 & 1 \end{pmatrix} \quad U = \begin{pmatrix} 1 & 3 & 0 \\ 0 & -2 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

$$2. \quad I = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \quad P_1 = \begin{pmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{pmatrix} \quad P_2 = \begin{pmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{pmatrix} \quad P_3 = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 0 & 1 \\ 0 & 1 & 0 \end{pmatrix}$$

3a If A is symmetric, 10 entries(assuming no repeats) can be chosen independently.

3b If A is skew-symmetric, 6 entries can be chosen independently

4a True

4b True

4c False

$$\text{Bonus} \quad \begin{pmatrix} 1 & 0 & 0 & 0 \\ 1 & 1 & 0 & 0 \\ 1 & 1 & 1 & 0 \\ 1 & 1 & 1 & 1 \end{pmatrix} \quad \begin{matrix} a & a & a & a \\ 0 & b-a & b-a & b-a \\ U = 0 & 0 & c-a & c-a \\ 0 & 0 & 0 & d-c \end{matrix}$$