Linear Algebra
Matlab Exam 2022/06/06

1. Set matrix M=[3 2 1 ; 6 5 4 ; 9 7 8], try to answer the following questions in order:
Each sub-problem is operated independently using the original matrix M.

(a) (5%) Extract the elements in the 3rd column and the 1st row of matrix M.

(b) (5%) Extract the first and second elements of the second column in the matrix M.

(c) (5%) Take all elements in column 2 of matrix M.

(d) (5%) Extract the first and third elements of the last column of matrix M.

(e) (5%) Add a row vector of all zeros to the rightmost edge of matrix M.

(f) (5%) Delete the last row of matrix M.

(g) (5%) Extract the elements from the 1st to the 2nd rows in the 1st to the 2nd columns of the matrix M.

2. Generate two random 6*6 matrices with integer entries by setting

$$A = \textbf{round}(10*\textbf{rand}(6))$$

and

$$B = \textbf{round}(20*\textbf{rand}(6)) - 10$$

Please write Matlab codes to compute each pair of matrix values for sub-problems (a) to (f). In each case, check whether the first value is equal to the second one.

(a) (5%) det(A)	$\det(A^T)$
(b) (5%) det(A - B)	det(A) - det(B)
(c) (5%) det(AB)	det(A) det(B)
(d) (5%) $\det(A^TB)$	$\det(A^T)$det(B)
(e) (5%) $\det(A^{-1})$	1/det(A)
(f) (5%) $\det(AB^{-1})$	det(A)/det(B)

3. (35%)Set

$$A = \textbf{round}(10*\textbf{rand}(7))$$

$$\textbf{b} = \textbf{round}(10*\textbf{rand}(7, 1))$$

$$M = \textbf{inv}(A)$$

Use the matrix M to solve the system Ay = **b** for y.