Math 33A
Linear Algebra and Applications

Discussion 1

Problem 1.

We say that two $n \times m$ matrices in reduced row-echelon form are of the same type if they contain the same number of leading 1's in the same positions. Give an example of two 2×3 matrices of the same type. Give an example of two 2×3 matrices of different type.

Problem 2($\star$).

How many types of 2×2 matrices in reduced row-echelon form are there?

Problem 3.

How many types of 3×2 matrices in reduced row-echelon form are there?

Problem 4.

Suppose you apply Gauss–Jordan elimination to a matrix. Explain how you can be sure that the resulting matrix is in reduced row-echelon form.

Problem 5.

Suppose matrix A is transformed into matrix B by means of an elementary row operation. Is there an elementary row operation that transforms B into A? Explain.

Problem 6.

Suppose matrix A is transformed into matrix B by a sequence of elementary row operations. Is there a sequence of elementary row operations that transforms B into A? Explain.

Problem 7.

Consider an $n \times m$ matrix A. Can you transform $\mathrm{rref}(A)$ into A by a sequence of elementary row operations? Explain.