User Guide

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1 Introduction

This project was to program a way to row reduce the matrix, find the inverse of a matrix, multiply matrices, and add matrices.

2 Accessing the Project

Navigate to RREF repository. Download the file *all_together.py* and *execute.py*.
Create an instance of the matrix class by assigning a matrix to $matrix$(your matrix goes here) inside the *execute.py* file. Now you can apply methods to this instance.

3 Class Methods

We created a matrix class in order to implement our goal.

Operation	Function Name
Row Reduced Echelon Form	.rref()
Inverse Matrix	.inverse()
Represent each entry as a fraction	.fraction()
Multiply Matrics	$*$
Add Matrics	$+$

Note that each method returns an instance of the matrix class, so to access the matrix itself you will have to add $.matrix$ to the end of the instance. Also, the $.fraction$ method returns a list of list of strings, so $.fraction()$ should be the last method applied to whatever operation you are applying to the matrix.

4 .rref()

This row reduces the matrix to echelon form. This method is a bijection between $\mathbb{R}^{m\times n}$ and $\mathbb{R}^{m\times n}$

5 .inverse()

This method returns the matrix B such that $rref(A) = BA$ where A is the input matrix. Thus when A is square and invertible, it will return the inverse of A where $I = rref(A) = BA$. This method is a bijection between $\mathbb{R}^{m\times n}$ and $\mathbb{R}^{m\times m}$

6 .fraction()

Returns the matrix as another matrix except each entry is a string in fraction form.

7 +

Matrix addition between two instances of matrix class. $f : \mathbb{R}^{m \times n} \times \mathbb{R}^{m \times n} \rightarrow \mathbb{R}^{m \times n}$.

8 *

Matrix multiplication between two instances of matrix class. $f : \mathbb{R}^{m \times n} \times \mathbb{R}^{n \times p} \rightarrow \mathbb{R}^{m \times p}$.