Math 480A2, Homework 1
Due September 1, 2022

Homework is graded out of a total of 10 points. Collaboration is permitted, but you must list all coauthors on a problem's solution at the top of the page, and your writing must be your own.

Problem 1. (3 points) Let A, B, C be the 2×2 matrices with entries in $\mathbb{Z}/5\mathbb{Z}$ specified below. Apply Freivalds' algorithm to demonstrate that $AB \neq C$.

$$A = \begin{pmatrix} 2 & 3 \\ 0 & 4 \end{pmatrix} \qquad B = \begin{pmatrix} 1 & 1 \\ 1 & 2 \end{pmatrix} \qquad C = \begin{pmatrix} 0 & 3 \\ 3 & 1 \end{pmatrix}$$

Problem 2. (3 points) With A, B, C as above, find a value $\mathbf{r} \in \mathbb{Z}/5\mathbb{Z}$ which, nonetheless, results in Freivalds' algorithm accepting the claim that $AB = C$.

Problem 3. (4 points) Write a paragraph or two about why you are interested in taking this course. Please include one question you would like to have answered during the semester, or one topic you would like to cover.