

Homework 1

Your Name(s) Here

Sample Text

This section shows some text, formulas, matrices, and code to show you how those are written in case you are not familiar with \LaTeX . **Please remove the \LaTeX commands for this entire page from your .tex file before you compile your final version for submission.**

A parametric expression for the plane $x_2 = 4$ in \mathbb{R}^3 is as follows:

$$\left\{ \mathbf{x} \mid \mathbf{x} = \begin{bmatrix} 0 \\ 4 \\ 0 \end{bmatrix} + \alpha \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} + \beta \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} \text{ for } \alpha, \beta \in \mathbb{R} \right\}.$$

Here is part of the text for the tennis problem: You are practicing tennis by bouncing a ball against a wall, as shown in Figure 1. The wall is made of a very strange mesh-like material: If the ball hits with velocity vector \mathbf{u} , then the ball leaves the wall with velocity vector

$$\mathbf{v} = A\mathbf{u} \quad \text{where} \quad A = \begin{bmatrix} 3 & 5\sqrt{3} \\ 5\sqrt{3} & -7 \end{bmatrix}.$$

The code in the provided file `embed.m` is as follows, typeset in a slightly smaller font:

```
function img = embed(s, img)

sz = size(img);
if length(sz) > 2 || ~isa(img, 'uint8')
    error('Gray-level unsigned 8-bit images only, please.')
end
```

You could also include it with the `VerbatimInput` command in the `fancyvrb` package, which must then be included in the preamble. The effect is the same, but the code in your \LaTeX now changes automatically if you change it in the file `embed.m`.

```
function img = embed(s, img)

% Check for proper image format
sz = grayImageSize(img);
```

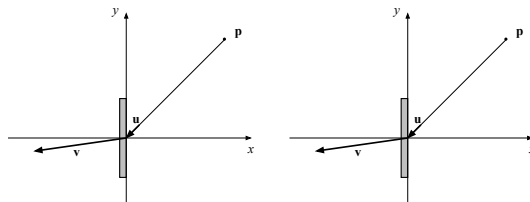


Figure 1: Two copies of the same figure , with a label that can be referenced from the text.

Problem 1

Problem 2

Problem 3

Problem 4

Problem 5

Problem 6

Problem 7(a)

Problem 7(b)

Problem 7(c)

Problem 8(a)

Problem 8(b)

Problem 8(c)