CS 4391 Introduction to Computer Vision Quiz 1

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Problem 1

The following 3×3 kernel is used in image filtering:

$$\begin{bmatrix} -1 & 0 & 1 \\ -2 & 0 & 2 \\ -3 & 0 & 3 \end{bmatrix} \tag{0.1}$$

Write down the kernel that can be used in an equivalent image convolution.

Problem 2

In the Harris corner detector, we have the sum of squared differences function defined as

$$f(\Delta x, \Delta y) = [\Delta x, \Delta y]\mathbf{M}\begin{bmatrix} \Delta x \\ \Delta y \end{bmatrix}. \tag{0.2}$$

Compute the R score of the following $\mathbf{M}$ matrix using $\kappa = 1$:

$$\mathbf{M} = \begin{bmatrix} 1 & -1 \\ -2 & 2 \end{bmatrix}. \tag{0.3}$$