Name: ——————————————————— Roll Number: ———————————————

The sum-of-squared differences (SSD) in an arbitrary direction $\mathbf{d}$ within an image patch is given by

$$\mathrm{SSD}(\mathbf{d}) = \mathbf{d}^T \mathbf{A} \mathbf{d}$$

where $\mathbf{A}$ is a symmetric, positive definite 2×2 matrix called the structure tensor.

1. (5 points) Show that the SSD in the direction of any eigenvector of $\mathbf{A}$ is the corresponding eigenvalue.

2. (5 points) Why is $\det(\mathbf{A}) = \lambda_{\text{large}} \lambda_{\text{small}}$ a good indicator of corner pixels?