

1. Determine a matrix  $A$  such that for any  $v \in \mathbb{R}^2$ ,  $Av$  is the reflection of  $v$  around the line  $y = -x$ .
2. This is a modification of problem 7.14 in the text, which you should read first.

The vector  $g = (0.1, 0.4, 0.5, 0.2)$ .

The vector  $r$  gives rainfall amounts per day in inches. So  $r = (1, 0, 0, 1)$  is one inch of rain on day 1, no rain for the next two days, and one inch of rain on day 4.

The vector  $h = g * r$  indicates river height above normal in inches per day, starting with the same day as  $r$ .

- a) Suppose  $r = (1, 0, 0, 0, 0, 0)$ . Compute  $h = g * r$ .
- b) Suppose  $r = (0, 1, 0, 0, 0, 0)$ . Compute  $h = g * r$ .
- c) Suppose  $r = (0, 2, 0, 0, 0, 0)$ . Compute  $h = g * r$ .
- d) Suppose  $r = (1, 1, 0, 0, 0, 0)$ . Compute  $h = g * r$ .
- e) Suppose  $r = (1, 2, 0, 0, 0, 0)$ . Compute  $h = g * r$ .
- f) Suppose  $r = (0, 0, 0, 0, 0, 1)$ . Compute  $h = g * r$ .
- g) Suppose  $r = (1, 0, 0, 0, 0, 1)$ . Compute  $h = g * r$ .
- h) Now finish problem 7.14.