Lecture 20 (5.3)

Math 170A

July 27, 2017
Let $A = \begin{bmatrix} 1 & 2 \\ 0 & 3 \end{bmatrix}$. Do 3 steps of the power method by hand, with the starting guess $q = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$. What are your estimates for $v_1$ and $\lambda_1$?

(a) $\lambda_1 \approx 3$, $v_1 \approx (1, 1)$
(b) $\lambda_1 \approx 3$, $v_1 \approx (26/27, 1)$
(c) $\lambda_1 \approx 1$, $v_1 \approx (1, 27/26)$
(d) $\lambda_1 \approx 1$, $v_1 \approx (1, 0)$
(e) None of these are correct.
2.

A has eigenvalues of 3 and 1/2. If I do the power method using $A^{-1}$, what will my scaling factor converge to?

(a) 1/3
(b) 1/2
(c) 2
(d) 3
(e) None of these are correct.
I do the power method using $A^{-1}$, and my scaling factor converges to $-7$. What is the smallest eigenvalue of $A$?

(a) $-1/7$
(b) $1/7$
(c) $7$
(d) $-7$
(e) None of these are correct.
I do the power method with \((A - 3I)^{-1}\) and my scaling factor converges to 7. What was an eigenvalue of \(A\)?

(a) \(1/7\)
(b) \(7\)
(c) \(10\)
(d) \(3 + \frac{1}{7}\)
(e) None of these are correct.