22A Homework 9

- UNGRADED
- AT LEAST ONE OF THESE PROBLEMS IS ON THE FINAL
- WATCH THIS SPACE FOR UPDATES!!

KOAL $\equiv$ Kolman/Hill, Edition 8, "*Introductory Linear Algebra*"

Question 1 Suppose eigenvectors $\vec{v}$ and $\vec{u}$ have the same eigenvalue. Show that $\alpha\vec{v} + \beta\vec{u}$ is also an eigenvector. Decide whether this is true for eigenvectors with distinct eigenvalues.

Question 2 Let
$$U = \left(\begin{array}{cc} 0 & u \\ 0 & 0 \end{array} \right).$$
Show
$$(I - U)^{-1} = I + U + U^2 + U^3 + \cdots.$$
Now suppose A is a symmetric matrix whose eigenvalues lie in the interval $(-1, 1)$. Use diagonalizability to prove
$$(I - A)^{-1} = I + A + A^2 + A^3 + \cdots.$$

Question 3 KOAL 8.3, pp 443-444, qq 1, 2, 6, 10, 12, 18.

Question 4 KOAL 8.3, p 444, qq T1, T2, T4, T6, T7.

Question 5 KOAL 6.6, pp 337-339, qq 2, 4, 6, 8, 10, 12, 14, 18, 20, 22, 26, 30, 36, 40.

Question 6 KOAL 6.6, p 339, qq T4, T6, T8, T10, T12.

Question 7 KOAL 10.1 p 507, qq 2, 4, 6, 8, 10, 12, 18.

Question 8 KOAL 10.1 p 508, qq T4, T6, T8, T12.

Question 9 KOAL 10.2, pp 519-520, qq 1, 2, 4, 6, 8, 10, 12, 14, 17, 20.

Question 10 KOAL 10.2, p 520, qq T3, T4, T6, T8, T10.

Question 11 KOAL 6.7, pp 349-351, qq 1, 2, 4, 6, 10, 13, 18, 26.

Question 12 KOAL 6.7, p 351, qq T1, T2, T4, T6.

Question 13 KOAL 10.3, pp 532-535, qq 1,2 4, 6, 9, 10, 14, 17, 20, 26.

Question 14 KOAL 10.3, p 535, qq T2, T4, T6, T8, T10.

Good Luck !