

Tutorial -2, Instructor: Dr. Avijit Pal, Linear Algebra (IC152) Semester: Winter

1. Let $A = \begin{bmatrix} 1 & -1 & 0 \\ 4 & -5 & 2 \\ 6 & -7 & 3 \end{bmatrix}$, then find A^{100} .

2. Let A be an 3×3 matrix with $\text{tr}(A) = 3$ and $\det(A) = 2$. If 1 is an eigen value of A , then find the eigen values of $A^2 - 2I$.

3. Let A be an 3×3 matrix with eigenvalues $1, -1, 0$. Then find the determinant of $I + A^{100}$.

4. Let A be an 2×2 real matrix . If $(\text{tr}(A))^2 > 4 \det(A)$, then A is diagonalizable.

5. Let V be the space of continuous real-valued functions on the real line. Let T be the linear map on V defined by

$$T(f(x)) = \int_0^x f(t)dt.$$

Prove that T has no eigen values.

6. Find the minimal polynomial of the following matrix.

$$\begin{pmatrix} 3 & 0 & 0 \\ 1 & 3 & 0 \\ 0 & 0 & 3 \end{pmatrix}$$