

Step-1

Suppose that $B = M^{-1}AM$. Then A and B have the same eigen values. $\hat{\in} \hat{\in}$ (1)

Suppose A has eigen values $\lambda = \lambda_1, \lambda_2, \dots, \lambda_n$

That is the roots of $|A - \lambda I| = 0$ are $\lambda = \lambda_1, \lambda_2, \dots, \lambda_n$ $\hat{\in} \hat{\in}$ (2)

Replacing A with $A + I$, we get $|(A + I) - \lambda I| = 0 \Rightarrow |A - (\lambda - 1)I| = 0$

So, its roots are $\lambda_1 - 1, \lambda_2 - 1, \dots, \lambda_n - 1$ which the eigen values of $A + I$ are. $\hat{\in} \hat{\in}$ (3)

We follow that the eigen values of A and that of $A + I$ are not same.

In view of (1), we confirm that A and $A + I$ are not similar.