

MA 423 – Matrix Computations

Lab – 9

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1 QUESTION - 2:

The output is as follows:

***** Sub-part 1 *****

Theoretical rate of convergence = 2.556817793836644e-01

Experimental rate of convergence = 2.556806914714703e-01

***** Sub-part 2 *****

Theoretical rate of convergence = 2.904339802659631e-01

Experimental rate of convergence = 4.392569437642739e-01

***** Sub-part 3 *****

Theoretical rate of convergence = 1

Experimental rate of convergence = 1.602716382132408e+00

Observations:

The table contains the eigen values of all the matrices such that $|\lambda_1| \geq |\lambda_2| \geq |\lambda_3|$.

Matrix	λ_1	λ_2	λ_3
(i)	8.58443	2.19488	1.22069
(ii)	8.45587	$1.77206 + 1.70032 i$	$1.77206 - 1.70032 i$
(iii)	$2.38007 + 2.53641 i$	$2.38007 - 2.53641 i$	1.23987

- In case (i), we can observe that it is a strict inequality. Hence, the convergence happens in this case and experimental rate is same as the theoretical rate.
- In case (ii), we have a dominant eigen value, but $|\lambda_2| = |\lambda_3|$. Hence the convergence happens but the experimental rate is slower than the theoretical rate.
- In case (iii), we do not have a dominant eigen value. Hence the Power method fails to converge in this case and we observe such a behaviour while calculating the rate of convergence.