Assignment - 2

(a) An eigenvalue of A is $\lambda_1 = 7.7016$

The corresponding eigenvector of A is

$$v_1 = \begin{bmatrix} -0.9582 \\ 0.2860 \end{bmatrix}$$

(b) The ratios $\frac{\|q_{j+1} - v\|}{\|q_j - v\|}$ for $j = 1, 2, \ldots$ are

0.0442
0.0445
0.0445
0.0445
0.0445
0.0445
0.0445
0.0445
0.0446
0.0452
0.0741

The exact eigenvalues of A are:-

$$\lambda_1 = 7.7016 \quad \& \quad \lambda_2 = 1.2984$$

The theoretical rate of convergence is:

$$r.o.c = 0.0445$$

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Q2 Eigenvalues of A are :-

$\lambda_1 = 16.1244$ $\lambda_2 = 8.1256$ $\lambda_3 = 4.2441$

$\lambda_4 = 2.2087$ $\lambda_5 = 0.2972$

Following are the iteration numbers at which deflations are observed :- (with error = 0.00001)

1st deflation : 6

2nd deflation : 18

3rd deflation : 18

4th deflation : 17

Q3 : Following are the eigenvalues :-

$\lambda_1 = 0.1522$
$\lambda_2 = 0.5858$
$\lambda_3 = 1.2346$
$\lambda_4 = 2.0000$
$\lambda_5 = 2.7654$
$\lambda_6 = 3.4142$
$\lambda_7 = 3.8478$

Following are the iteration numbers, at which they were obtained :-

$\lambda_1 \rightarrow 24$, $\lambda_2 \rightarrow 24$ $\lambda_3 \rightarrow 99$ $\lambda_4 \rightarrow 99$
$\lambda_5 \rightarrow 99$ $\lambda_6 \rightarrow 99$ $\lambda_7 \rightarrow 99$.