LOWEST EIGENVALUE BY POWER METHOD

$$[A]^{-1} = \begin{matrix} -1/4 & 1/7 & 0 \\ 1/7 & 43/21 & -5/3 \\ 0 & -5/3 & 4/3 \end{matrix}$$

① $$[A]^{-1} \times \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix} = \begin{matrix} 1/14 \\ 11/21 \\ -1/3 \end{matrix} = 11/21 \begin{pmatrix} 3/22 \\ 1 \\ -11/7 \end{pmatrix}$$

② $$\begin{matrix} 41/308 \\ 2165/462 \\ -79/21 \end{matrix} = 2165/462 \begin{pmatrix} 123/4330 \\ 1 \\ -1730/2165 \end{pmatrix}$$

③ $$\begin{matrix} 8537/60620 \\ 308219/90930 \\ -17777/6495 \end{matrix} = \frac{308219}{90930} \begin{pmatrix} \frac{25611}{616436} \\ 1 \\ -\frac{248878}{308219} \end{pmatrix}$$

④ $$\begin{matrix} 1207265/8630132 \\ \boxed{4400512 7/12945198} \\ -2536607/924657 \end{matrix}$$

$$\boxed{\lambda_{SMALL} = 1 \Big/ \frac{44005127}{12945198} \simeq 0.294}$$

For $x_3 = 1$ $\quad V_{\lambda\,SMALL} \simeq \begin{pmatrix} -0.051 \\ -1.239 \\ 1 \end{pmatrix}$

SARRUS METHOD

$$\begin{matrix} 2-\lambda & 8 & 10 \\ 8 & 4-\lambda & 5 \\ 10 & 5 & 7-\lambda \end{matrix} \Rightarrow 0 = \left[\begin{matrix} 2-\lambda & 8 & 10 \\ 8 & 4-\lambda & 5 \\ 10 & 5 & 7-\lambda \end{matrix}\right] \left|\begin{matrix} 2-\lambda & 8 \\ 8 & 4-\lambda \\ 10 & 5 \end{matrix}\right]$$

$$(2-\lambda)(4-\lambda)(7-\lambda) + 8\cdot 5\cdot 10 + 10\cdot 8\cdot 5$$

$$- 8\cdot 8(7-\lambda) - (2-\lambda)(5)5 - 10(4-\lambda)10 =$$

$$56 - 50\lambda + 13\lambda^2 - \lambda^3 + 400 + 400$$

$$-448 + 64\lambda - 50 + 25\lambda - 400 + 100\lambda =$$

$$-42 + 139\lambda + 13\lambda^2 - \lambda^3 \Rightarrow$$

$$\lambda^3 - 13\lambda^2 - 139\lambda + 42 = 0$$

$$\lambda(\lambda^2 - 13\lambda - 139) + 42 = 0$$

ROOTS $= 6.925 \pm 0.311i$, 20.0411

-7.178, 0.294, 19.884

$1, -13, -139, 42$

$$\begin{array}{r|l} 42 & 2 \\ 21 & 3 \\ 7 & 7 \\ 1 & \end{array}$$

$2: 8 - 52 - 278 + 42 \neq 0$

$3: 27 - 117 - 417 + 42 \neq 0$

$7: 343 - 637 - 973 + 42 \neq 0$

$$\frac{d\lambda}{d} = 3\lambda^2 - 26\lambda - 139$$

HIGHEST EIGENVALUE 34

POWER METHOD

1

20
17
22

$$22 \begin{bmatrix} 10/11 \\ 17/22 \\ 1 \end{bmatrix}$$

2

18
169/11
439/22

$$439/22 \begin{bmatrix} 391/439 \\ 378/439 \\ 1 \end{bmatrix}$$

3

7886/439
6715/439 = 8723/439
8723/439

$$\begin{bmatrix} 7886/8723 \\ 6715/8723 \\ 1 \end{bmatrix}$$

4

156722/8723
133563/8723 = 17349/8723
173496/8723

$$\begin{bmatrix} 156722/173496 \\ 133563/173496 \\ 1 \end{bmatrix}$$

5

779227/43374
663877/43374 = 3449507/173496
3449507/173496

$$\boxed{\lambda_{HIGH} \simeq 19.882}$$

For $x_3 = 1$ $\quad V_{\lambda_{HIGH}} = \begin{pmatrix} 0.904 \\ 0.770 \\ 1 \end{pmatrix}$