- **Summary**：

1. The results were obtained by implementing the fem1d code. The natural frequencies of longitudinal vibration using four and eight linear elements, and comparisons with the exact solutions are listed as follows.

MESH	ω_1	ω_2	ω_3	ω_4	ω_5	ω_6	ω_7	ω_8
4L	3.2048E3	10.110E3	18.365E3	26.558E3	--	--	--	--
8L	3.1895E3	9.6917E3	16.566E3	24.055E3	32.325E3	41.225E3	49.733E3	55.380E3
EXACT	3.1843E3	9.5530E3	15.922E3	22.290E3	28.659E3	35.028E3	41.396E3	47.765E3

2. The results were obtained by implementing the fem1d code. The natural frequencies of transverse vibration using four and eight linear elements, and comparisons with the exact solutions are listed in the following tables.

MESH	ω_1	ω_2	ω_3	ω_4	ω_5	ω_6	ω_7	ω_8
4L	17.396	70.397	161.03	311.10	497.59	784.69	1148.7	1499.5
8L	17.391	70.131	158.15	282.04	443.17	644.16	892.03	1231.8
EXACT	22.0691	88.2764	198.6220	353.1057	551.7277	794.4878	1081.3862	1412.4228

MESH	ω_9	ω_{10}	ω_{11}	ω_{12}	ω_{13}	ω_{14}	ω_{15}	ω_{16}
4L	--	--	--	--	--	--	--	--
8L	1567.7	1988.8	2510.6	3141.0	3877.9	4630.7	5203.2	6354.0
EXACT	1787.5976	2206.9106	2670.3619	3177.9513	3729.6790	4325.5448	4965.5489	5649.6912

- **The outputs of the code are listed below,**

The output of problem 1 with 4 linear elements.

```
   *** ECHO OF THE INPUT DATA STARTS ***
 1  0  3                    MODEL, NTYPE, ITEM
 1  4                       IELEM, NEM
 1  1                       ICONT, NPRNT
 0   25  25   25   25          DX(I)
 30.0E6  0.0E6                   AX0,  AX1
 0.0   0.0                     BX0,  BX1
 0.0   0.0                     CX0, CX1
 1                           NSPV
 1  1  0.0                    ISPV(1,1), ISPV(1,2), VSPV(1)
 0                           NNBC
 0                           NMPC
 0.00073            0.0                                  CT0, CT1

**** ECHO OF THE INPUT DATA ENDS ****
 ------------------------------------------------------

     OUTPUT from program   FEM1D   by J N REDDY
 ------------------------------------------------------
  *** ANALYSIS OF MODEL 1, AND TYPE 0 PROBLEM ***
         (see the code below)
  MODEL=1,NTYPE=0: A problem described by MODEL EQ. 1
  MODEL=1,NTYPE=1: A circular DISK (PLANE STRESS)
  MODEL=1,NTYPE>1: A circular DISK (PLANE STRAIN)
```

```
 MODEL=2,NTYPE=0: A Timoshenko BEAM (RIE) problem
 MODEL=2,NTYPE=1: A Timoshenko PLATE (RIE) problem
 MODEL=2,NTYPE=2: A Timoshenko BEAM (CIE) problem
 MODEL=2,NTYPE>2: A Timoshenko PLATE (CIE) problem
 MODEL=3,NTYPE=0: A Euler-Bernoulli BEAM problem
 MODEL=3,NTYPE>0: A Euler-Bernoulli Circular plate
 MODEL=4,NTYPE=0: A plane TRUSS problem
 MODEL=4,NTYPE=1: A Euler-Bernoulli FRAME problem
 MODEL=4,NTYPE=2: A Timoshenko (CIE) FRAME problem
    Element type (0, Hermite,>0, Lagrange)..=   1
    No. of deg. of freedom per node, NDF....=   1
    No. of elements in the mesh, NEM........=   4
    No. of total DOF in the model, NEQ......=   5
    Half bandwidth of matrix [GLK], NHBW ...=   2
    No. of specified primary DOF, NSPV......=   1
    No. of specified secondary DOF, NSSV....=   0
    No. of specified Newton B. C.: NNBC.....=   0
    No. of speci. multi-pt. cond.: NMPC.....=   0
 E I G E N V A L U E   A N A L Y S I S
    Coefficient, CT0.......................=  0.7300E-03
    Coefficient, CT1.......................=  0.0000E+00

 Boundary information on primary variables:
     1    1

 Global coordinates of the nodes, {GLX}:
 0.00000E+00  0.25000E+02  0.50000E+02  0.75000E+02  0.10000E+03

 Coefficients of the differential equation:
    AX0 =  0.3000E+08     AX1 =  0.0000E+00
    BX0 =  0.0000E+00     BX1 =  0.0000E+00
    CX0 =  0.0000E+00     CX1 =  0.0000E+00
    FX0 =  0.0000E+00     FX1 =  0.0000E+00     FX2 =  0.0000E+00

 Element coefficient matrix, [ELK]:
 0.12000E+07 -0.12000E+07
-0.12000E+07  0.12000E+07

 Element coefficient matrix, [ELM]:
 0.60833E-02  0.30417E-02
 0.30417E-02  0.60833E-02

 Element coefficient matrix, [ELK]:
 0.12000E+07 -0.12000E+07
-0.12000E+07  0.12000E+07

 Element coefficient matrix, [ELM]:
 0.60833E-02  0.30417E-02
 0.30417E-02  0.60833E-02

 Element coefficient matrix, [ELK]:
 0.12000E+07 -0.12000E+07
-0.12000E+07  0.12000E+07

 Element coefficient matrix, [ELM]:
 0.60833E-02  0.30417E-02
 0.30417E-02  0.60833E-02
```

```
 Element coefficient matrix, [ELK]:
  0.12000E+07 -0.12000E+07
 -0.12000E+07  0.12000E+07

 Element coefficient matrix, [ELM]:
  0.60833E-02  0.30417E-02
  0.30417E-02  0.60833E-02
   Number of rotations taken in JACOBI =  20
   EIGENVALUE( 1) =   0.705321E+09  SQRT(EGNVAL) =   0.26558E+05
   EIGENVECTOR:
  0.33444E+01 -0.61797E+01  0.80742E+01 -0.87394E+01
   EIGENVALUE( 2) =   0.337285E+09  SQRT(EGNVAL) =   0.18365E+05
   EIGENVECTOR:
  0.65862E+01 -0.50408E+01 -0.27281E+01  0.71288E+01
   EIGENVALUE( 3) =   0.102214E+09  SQRT(EGNVAL) =   0.10110E+05
   EIGENVECTOR:
  0.54262E+01  0.41530E+01 -0.22476E+01 -0.58733E+01
   EIGENVALUE( 4) =   0.102710E+08  SQRT(EGNVAL) =   0.32048E+04
   EIGENVECTOR:
  0.20290E+01  0.37490E+01  0.48984E+01  0.53019E+01
Stop - Program terminated.
```

The output of problem 1 with 8 linear elements.

```
   *** ECHO OF THE INPUT DATA STARTS ***
 1  0  3                    MODEL, NTYPE, ITEM
 1  8                       IELEM, NEM
 1  1                       ICONT, NPRNT
 0   12.5  12.5   12.5   12.5   12.5   12.5  12.5  12.5          DX(I)
 30.0E6  0.0E6                  AX0,  AX1
 0.0   0.0                    BX0,  BX1
 0.0   0.0                    CX0, CX1
 1                          NSPV
 1  1  0.0                    ISPV(1,1), ISPV(1,2), VSPV(1)
 0                          NNBC
 0                          NMPC
 0.00073           0.0                                          CT0, CT1
   **** ECHO OF THE INPUT DATA ENDS ****

 ___________________________________________________________
    OUTPUT from program   FEM1D   by J N REDDY
 ___________________________________________________________
  *** ANALYSIS OF MODEL 1, AND TYPE 0 PROBLEM ***
        (see the code below)
  MODEL=1,NTYPE=0: A problem described by MODEL EQ. 1
  MODEL=1,NTYPE=1: A circular DISK (PLANE STRESS)
  MODEL=1,NTYPE>1: A circular DISK (PLANE STRAIN)
  MODEL=2,NTYPE=0: A Timoshenko BEAM (RIE) problem
  MODEL=2,NTYPE=1: A Timoshenko PLATE (RIE) problem
  MODEL=2,NTYPE=2: A Timoshenko BEAM (CIE) problem
  MODEL=2,NTYPE>2: A Timoshenko PLATE (CIE) problem
  MODEL=3,NTYPE=0: A Euler-Bernoulli BEAM problem
  MODEL=3,NTYPE>0: A Euler-Bernoulli Circular plate
  MODEL=4,NTYPE=0: A plane TRUSS problem
  MODEL=4,NTYPE=1: A Euler-Bernoulli FRAME problem
  MODEL=4,NTYPE=2: A Timoshenko (CIE) FRAME problem

     Element type (0, Hermite,>0, Lagrange)..=   1
     No. of deg. of freedom per node, NDF....=   1
```

No. of elements in the mesh, NEM........= 8
No. of total DOF in the model, NEQ......= 9
Half bandwidth of matrix [GLK], NHBW ...= 2
No. of specified primary DOF, NSPV......= 1
No. of specified secondary DOF, NSSV....= 0
No. of specified Newton B. C.: NNBC.....= 0
No. of speci. multi-pt. cond.: NMPC.....= 0

E I G E N V A L U E A N A L Y S I S
Coefficient, CT0.......................= 0.7300E-03
Coefficient, CT1.......................= 0.0000E+00

Boundary information on primary variables:
1 1

Global coordinates of the nodes, {GLX}:
0.00000E+00 0.12500E+02 0.25000E+02 0.37500E+02 0.50000E+02
0.62500E+02 0.75000E+02 0.87500E+02 0.10000E+03

Coefficients of the differential equation:
AX0 = 0.3000E+08 AX1 = 0.0000E+00
BX0 = 0.0000E+00 BX1 = 0.0000E+00
CX0 = 0.0000E+00 CX1 = 0.0000E+00
FX0 = 0.0000E+00 FX1 = 0.0000E+00 FX2 = 0.0000E+00

Element coefficient matrix, [ELK]:
0.24000E+07 -0.24000E+07
-0.24000E+07 0.24000E+07

Element coefficient matrix, [ELM]:
0.30417E-02 0.15208E-02
0.15208E-02 0.30417E-02

Element coefficient matrix, [ELK]:
0.24000E+07 -0.24000E+07
-0.24000E+07 0.24000E+07

Element coefficient matrix, [ELM]:
0.30417E-02 0.15208E-02
0.15208E-02 0.30417E-02

Element coefficient matrix, [ELK]:
0.24000E+07 -0.24000E+07
-0.24000E+07 0.24000E+07

Element coefficient matrix, [ELM]:
0.30417E-02 0.15208E-02
0.15208E-02 0.30417E-02

Element coefficient matrix, [ELK]:
0.24000E+07 -0.24000E+07
-0.24000E+07 0.24000E+07

Element coefficient matrix, [ELM]:
0.30417E-02 0.15208E-02
0.15208E-02 0.30417E-02

Element coefficient matrix, [ELK]:

```
 0.24000E+07 -0.24000E+07
-0.24000E+07  0.24000E+07

 Element coefficient matrix, [ELM]:
 0.30417E-02  0.15208E-02
 0.15208E-02  0.30417E-02

  Number of rotations taken in JACOBI = 111
  EIGENVALUE( 1) =   0.306691E+10  SQRT(EGNVAL) =   0.55380E+05
  EIGENVECTOR:
 0.17519E+01 -0.34365E+01  0.49891E+01 -0.63499E+01  0.74667E+01
-0.82965E+01  0.88076E+01 -0.89801E+01
  EIGENVALUE( 2) =   0.247337E+10  SQRT(EGNVAL) =   0.49733E+05
  EIGENVECTOR:
-0.46594E+01  0.77484E+01 -0.82256E+01  0.59303E+01 -0.16362E+01
-0.32095E+01  0.69733E+01 -0.83868E+01
  EIGENVALUE( 3) =   0.169951E+10  SQRT(EGNVAL) =   0.41225E+05
  EIGENVECTOR:
 0.62721E+01 -0.69692E+01  0.14716E+01  0.53340E+01 -0.73984E+01
 0.28867E+01  0.41909E+01 -0.75434E+01
  EIGENVALUE( 4) =   0.104490E+10  SQRT(EGNVAL) =   0.32325E+05
  EIGENVECTOR:
-0.66185E+01  0.25824E+01  0.56109E+01 -0.47717E+01 -0.37491E+01
 0.62345E+01  0.13165E+01 -0.67482E+01
  EIGENVALUE( 5) =   0.578661E+09  SQRT(EGNVAL) =   0.24055E+05
  EIGENVECTOR:
 0.60015E+01  0.23417E+01 -0.50879E+01 -0.43269E+01  0.33996E+01
 0.56533E+01 -0.11938E+01 -0.61191E+01
  EIGENVALUE( 6) =   0.274438E+09  SQRT(EGNVAL) =   0.16566E+05
  EIGENVECTOR:
-0.47154E+01 -0.52394E+01 -0.11064E+01  0.40101E+01  0.55622E+01
 0.21703E+01 -0.31507E+01 -0.56711E+01
  EIGENVALUE( 7) =   0.939282E+08  SQRT(EGNVAL) =   0.96917E+04
  EIGENVECTOR:
-0.29933E+01 -0.49776E+01 -0.52842E+01 -0.38097E+01 -0.10511E+01
 0.20618E+01  0.44798E+01  0.53878E+01
  EIGENVALUE( 8) =   0.101726E+08  SQRT(EGNVAL) =   0.31895E+04
  EIGENVECTOR:
 0.10244E+01  0.20095E+01  0.29173E+01  0.37131E+01  0.43661E+01
 0.48514E+01  0.51502E+01  0.52511E+01
Stop - Program terminated.
```

The output of problem 2 with 4 linear elements.

```
   *** ECHO OF THE INPUT DATA STARTS ***
 3  0  3                    MODEL, NTYPE, ITEM
 1  4                       IELEM, NEM
 1  1                       ICONT, NPRNT
 0   25  25   25   25             DX(I)
 0.0   0.0                   AX0,  AX1
 0.365E6   0.0                     BX0,  BX1
 0.0   0.0                   CX0, CX1
 2                          NSPV
 1  1  0.0                  ISPV(1,1), ISPV(1,2), VSPV(1)
 5  1  0.0
 0                          NNBC
 0                          NMPC
```

```
0.00073          8.8817E-6                          CT0, CT1
 **** ECHO OF THE INPUT DATA ENDS ****

_____________________________________________________

   OUTPUT from program   FEM1D   by J N REDDY

_____________________________________________________

 *** ANALYSIS OF MODEL 3, AND TYPE 0 PROBLEM ***
       (see the code below)
 MODEL=1,NTYPE=0: A problem described by MODEL EQ. 1
 MODEL=1,NTYPE=1: A circular DISK (PLANE STRESS)
 MODEL=1,NTYPE>1: A circular DISK (PLANE STRAIN)
 MODEL=2,NTYPE=0: A Timoshenko BEAM (RIE) problem
 MODEL=2,NTYPE=1: A Timoshenko PLATE (RIE) problem
 MODEL=2,NTYPE=2: A Timoshenko BEAM (CIE) problem
 MODEL=2,NTYPE>2: A Timoshenko PLATE (CIE) problem
 MODEL=3,NTYPE=0: A Euler-Bernoulli BEAM problem
 MODEL=3,NTYPE>0: A Euler-Bernoulli Circular plate
 MODEL=4,NTYPE=0: A plane TRUSS problem
 MODEL=4,NTYPE=1: A Euler-Bernoulli FRAME problem
 MODEL=4,NTYPE=2: A Timoshenko (CIE) FRAME problem
    Element type (0, Hermite,>0, Lagrange)..=   0
    No. of deg. of freedom per node, NDF....=   2
    No. of elements in the mesh, NEM........=   4
    No. of total DOF in the model, NEQ......=  10
    Half bandwidth of matrix [GLK], NHBW ...=   4
    No. of specified primary DOF, NSPV......=   2
    No. of specified secondary DOF, NSSV....=   0
    No. of specified Newton B. C.: NNBC.....=   0
    No. of speci. multi-pt. cond.: NMPC.....=   0

 E I G E N V A L U E  A N A L Y S I S
    Coefficient, CT0.........................=  0.7300E-03
    Coefficient, CT1.........................=  0.8882E-05

Boundary information on primary variables:
    1   1
    5   1

Global coordinates of the nodes, {GLX}:
 0.00000E+00  0.25000E+02  0.50000E+02  0.75000E+02  0.10000E+03

Coefficients of the differential equation:
    AX0 =  0.0000E+00     AX1 =  0.0000E+00
    BX0 =  0.3650E+06     BX1 =  0.0000E+00
    CX0 =  0.0000E+00     CX1 =  0.0000E+00
Element coefficient matrix, [ELK]:
 0.28032E+03 -0.35040E+04 -0.28032E+03 -0.35040E+04
-0.35040E+04  0.58400E+05  0.35040E+04  0.29200E+05
-0.28032E+03  0.35040E+04  0.28032E+03  0.35040E+04
-0.35040E+04  0.29200E+05  0.35040E+04  0.58400E+05

Element coefficient matrix, [ELM]:
 0.72544E-02 -0.26212E-01  0.27033E-02  0.16105E-01
-0.26212E-01  0.12102E+00 -0.16435E-01 -0.93864E-01
 0.27033E-02 -0.16435E-01  0.83646E-02  0.28855E-01
 0.16105E-01 -0.93864E-01  0.28855E-01  0.12928E+00

Element coefficient matrix, [ELK]:
 0.28032E+03 -0.35040E+04 -0.28032E+03 -0.35040E+04
```

```
-0.35040E+04  0.58400E+05  0.35040E+04  0.29200E+05
-0.28032E+03  0.35040E+04  0.28032E+03  0.35040E+04
-0.35040E+04  0.29200E+05  0.35040E+04  0.58400E+05

Element coefficient matrix, [ELM]:
 0.93162E-02 -0.33481E-01  0.34170E-02  0.20400E-01
-0.33481E-01  0.15406E+00 -0.20730E-01 -0.11865E+00
 0.34170E-02 -0.20730E-01  0.10426E-01  0.36124E-01
 0.20400E-01 -0.11865E+00  0.36124E-01  0.16232E+00

Element coefficient matrix, [ELK]:
 0.28032E+03 -0.35040E+04 -0.28032E+03 -0.35040E+04
-0.35040E+04  0.58400E+05  0.35040E+04  0.29200E+05
-0.28032E+03  0.35040E+04  0.28032E+03  0.35040E+04
-0.35040E+04  0.29200E+05  0.35040E+04  0.58400E+05

Element coefficient matrix, [ELM]:
 0.11378E-01 -0.40750E-01  0.41307E-02  0.24695E-01
-0.40750E-01  0.18711E+00 -0.25026E-01 -0.14343E+00
 0.41307E-02 -0.25026E-01  0.12488E-01  0.43394E-01
 0.24695E-01 -0.14343E+00  0.43394E-01  0.19537E+00

Element coefficient matrix, [ELK]:
 0.28032E+03 -0.35040E+04 -0.28032E+03 -0.35040E+04
-0.35040E+04  0.58400E+05  0.35040E+04  0.29200E+05
-0.28032E+03  0.35040E+04  0.28032E+03  0.35040E+04
-0.35040E+04  0.29200E+05  0.35040E+04  0.58400E+05

Element coefficient matrix, [ELM]:
 0.13440E-01 -0.48019E-01  0.48444E-02  0.28991E-01
-0.48019E-01  0.22015E+00 -0.29321E-01 -0.16821E+00
 0.48444E-02 -0.29321E-01  0.14550E-01  0.50663E-01
 0.28991E-01 -0.16821E+00  0.50663E-01  0.22841E+00

  Number of rotations taken in JACOBI = 101
  EIGENVALUE( 1) =   0.224859E+07  SQRT(EGNVAL) =   0.14995E+04
  EIGENVECTOR:
-0.29010E+01 -0.15036E+01 -0.23275E+01 -0.12414E+01 -0.14736E+01
-0.62510E+00 -0.91217E+00 -0.72212E+00
  EIGENVALUE( 2) =   0.131940E+07  SQRT(EGNVAL) =   0.11487E+04
  EIGENVECTOR:
-0.16191E+01 -0.27372E+01 -0.62094E+00 -0.21449E+01  0.92102E+00
-0.76519E+00  0.17861E+01  0.19777E+01
  EIGENVALUE( 3) =   0.615739E+06  SQRT(EGNVAL) =   0.78469E+03
  EIGENVECTOR:
 0.13902E+01  0.40552E+01 -0.37749E+00 -0.13117E+01 -0.12999E+01
-0.32291E+01  0.34636E+00  0.13977E+01
  EIGENVALUE( 4) =   0.247594E+06  SQRT(EGNVAL) =   0.49759E+03
  EIGENVECTOR:
 0.98258E+00  0.21295E+01 -0.84033E+00 -0.37577E+01  0.30194E+00
 0.31363E+01  0.49724E+00 -0.93436E+00
  EIGENVALUE( 5) =   0.967854E+05  SQRT(EGNVAL) =   0.31110E+03
  EIGENVECTOR:
-0.62444E+00  0.10708E+01  0.61899E+00 -0.12129E+01 -0.61973E+00
 0.83061E+00  0.64366E+00 -0.66217E+00
  EIGENVALUE( 6) =   0.259312E+05  SQRT(EGNVAL) =   0.16103E+03
  EIGENVECTOR:
-0.41744E+00  0.38822E+01  0.24692E+00 -0.41935E+01  0.82485E-01
```

```
  0.23390E+01 -0.31624E+00  0.39194E+00
   EIGENVALUE( 7) =   0.495570E+04  SQRT(EGNVAL) =   0.70397E+02
   EIGENVECTOR:
 -0.26659E+00  0.44925E+01 -0.23543E-01  0.75279E+00  0.26209E+00
 -0.38562E+01  0.23798E-01 -0.25810E+00
   EIGENVALUE( 8) =   0.302612E+03  SQRT(EGNVAL) =   0.17396E+02
   EIGENVECTOR:
 -0.12720E+00  0.28789E+01 -0.91634E-01  0.41241E+01 -0.23292E-02
  0.29537E+01  0.91590E-01  0.13195E+00
Stop - Program terminated.
```

The output of problem 2 with 8 linear elements.

```
   *** ECHO OF THE INPUT DATA STARTS ***
 3  0  3                      MODEL, NTYPE, ITEM
 1  8                         IELEM, NEM
 1  1                         ICONT, NPRNT
 0   12.5  12.5   12.5   12.5   12.5   12.5   12.5   12.5    DX(I)
 0.0   0.0                     AX0,  AX1
 0.365E6   0.0                   BX0,  BX1
 0.0   0.0                     CX0, CX1
 2                           NSPV
 1  1  0.0                     ISPV(1,1), ISPV(1,2), VSPV(1)
 9  1  0.0
 0                           NNBC
 0                           NMPC
 0.00073           8.8817E-6                    CT0, CT1
   **** ECHO OF THE INPUT DATA ENDS ****

 ____________________________________________________________
    OUTPUT from program   FEM1D   by J N REDDY
 ____________________________________________________________

  *** ANALYSIS OF MODEL 3, AND TYPE 0 PROBLEM ***
         (see the code below)
  MODEL=1,NTYPE=0: A problem described by MODEL EQ. 1
  MODEL=1,NTYPE=1: A circular DISK (PLANE STRESS)
  MODEL=1,NTYPE>1: A circular DISK (PLANE STRAIN)
  MODEL=2,NTYPE=0: A Timoshenko BEAM (RIE) problem
  MODEL=2,NTYPE=1: A Timoshenko PLATE (RIE) problem
  MODEL=2,NTYPE=2: A Timoshenko BEAM (CIE) problem
  MODEL=2,NTYPE>2: A Timoshenko PLATE (CIE) problem
  MODEL=3,NTYPE=0: A Euler-Bernoulli BEAM problem
  MODEL=3,NTYPE>0: A Euler-Bernoulli Circular plate
  MODEL=4,NTYPE=0: A plane TRUSS problem
  MODEL=4,NTYPE=1: A Euler-Bernoulli FRAME problem
  MODEL=4,NTYPE=2: A Timoshenko (CIE) FRAME problem
     Element type (0, Hermite,>0, Lagrange)..=   0
     No. of deg. of freedom per node, NDF....=   2
     No. of elements in the mesh, NEM........=   8
     No. of total DOF in the model, NEQ......=  18
     Half bandwidth of matrix [GLK], NHBW ...=   4
     No. of specified primary DOF, NSPV......=   2
     No. of specified secondary DOF, NSSV....=   0
     No. of specified Newton B. C.: NNBC.....=   0
     No. of speci. multi-pt. cond.: NMPC.....=   0

  E I G E N V A L U E  A N A L Y S I S
     Coefficient, CT0.........................=  0.7300E-03
     Coefficient, CT1.........................=  0.8882E-05
```

Boundary information on primary variables:
1 1
9 1
Global coordinates of the nodes, {GLX}:
0.00000E+00 0.12500E+02 0.25000E+02 0.37500E+02 0.50000E+02
0.62500E+02 0.75000E+02 0.87500E+02 0.10000E+03

Coefficients of the differential equation:
AX0 = 0.0000E+00 AX1 = 0.0000E+00
BX0 = 0.3650E+06 BX1 = 0.0000E+00
CX0 = 0.0000E+00 CX1 = 0.0000E+00

Element coefficient matrix, [ELK]:
0.22426E+04 -0.14016E+05 -0.22426E+04 -0.14016E+05
-0.14016E+05 0.11680E+06 0.14016E+05 0.58400E+05
-0.22426E+04 0.14016E+05 0.22426E+04 0.14016E+05
-0.14016E+05 0.58400E+05 0.14016E+05 0.11680E+06

Element coefficient matrix, [ELM]:
0.35082E-02 -0.62638E-02 0.12624E-02 0.37783E-02
-0.62638E-02 0.14353E-01 -0.38196E-02 -0.10959E-01
0.12624E-02 -0.38196E-02 0.37858E-02 0.65942E-02
0.37783E-02 -0.10959E-01 0.65942E-02 0.14870E-01

Element coefficient matrix, [ELK]:
0.22426E+04 -0.14016E+05 -0.22426E+04 -0.14016E+05
-0.14016E+05 0.11680E+06 0.14016E+05 0.58400E+05
-0.22426E+04 0.14016E+05 0.22426E+04 0.14016E+05
-0.14016E+05 0.58400E+05 0.14016E+05 0.11680E+06

Element coefficient matrix, [ELM]:
0.40237E-02 -0.71725E-02 0.14409E-02 0.43153E-02
-0.71725E-02 0.16418E-01 -0.43566E-02 -0.12507E-01
0.14409E-02 -0.43566E-02 0.43012E-02 0.75029E-02
0.43153E-02 -0.12507E-01 0.75029E-02 0.16935E-01

Element coefficient matrix, [ELK]:
0.22426E+04 -0.14016E+05 -0.22426E+04 -0.14016E+05
-0.14016E+05 0.11680E+06 0.14016E+05 0.58400E+05
-0.22426E+04 0.14016E+05 0.22426E+04 0.14016E+05
-0.14016E+05 0.58400E+05 0.14016E+05 0.11680E+06

Element coefficient matrix, [ELM]:
0.45391E-02 -0.80811E-02 0.16193E-02 0.48522E-02
-0.80811E-02 0.18484E-01 -0.48935E-02 -0.14056E-01
0.16193E-02 -0.48935E-02 0.48167E-02 0.84116E-02
0.48522E-02 -0.14056E-01 0.84116E-02 0.19000E-01

Element coefficient matrix, [ELK]:
0.22426E+04 -0.14016E+05 -0.22426E+04 -0.14016E+05
-0.14016E+05 0.11680E+06 0.14016E+05 0.58400E+05
-0.22426E+04 0.14016E+05 0.22426E+04 0.14016E+05
-0.14016E+05 0.58400E+05 0.14016E+05 0.11680E+06

Element coefficient matrix, [ELM]:
0.50546E-02 -0.89898E-02 0.17977E-02 0.53891E-02
-0.89898E-02 0.20549E-01 -0.54304E-02 -0.15605E-01
0.17977E-02 -0.54304E-02 0.53322E-02 0.93202E-02

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 0.53891E-02 -0.15605E-01  0.93202E-02  0.21065E-01

Element coefficient matrix, [ELK]:
 0.22426E+04 -0.14016E+05 -0.22426E+04 -0.14016E+05
-0.14016E+05  0.11680E+06  0.14016E+05  0.58400E+05
-0.22426E+04  0.14016E+05  0.22426E+04  0.14016E+05
-0.14016E+05  0.58400E+05  0.14016E+05  0.11680E+06

Element coefficient matrix, [ELM]:
 0.55701E-02 -0.98984E-02  0.19761E-02  0.59261E-02
-0.98984E-02  0.22614E-01 -0.59674E-02 -0.17154E-01
 0.19761E-02 -0.59674E-02  0.58476E-02  0.10229E-01
 0.59261E-02 -0.17154E-01  0.10229E-01  0.23130E-01

  Number of rotations taken in JACOBI = 480
  EIGENVALUE( 1) =   0.403729E+08  SQRT(EGNVAL) =   0.63540E+04
  EIGENVECTOR:
 0.81042E+01  0.16595E+01  0.69296E+01  0.17842E+01  0.47894E+01
 0.13399E+01  0.28969E+01  0.83981E+00  0.15956E+01  0.46639E+00
 0.82361E+00  0.23206E+00  0.41393E+00  0.93729E-01  0.22390E+00
 0.16896E+00
  EIGENVALUE( 2) =   0.270738E+08  SQRT(EGNVAL) =   0.52032E+04
  EIGENVECTOR:
-0.34868E+01 -0.23196E+01 -0.19018E+01 -0.23795E+01  0.10622E+01
-0.12883E+01  0.32986E+01 -0.19826E+00  0.41616E+01  0.40716E+00
 0.39946E+01  0.53963E+00  0.33962E+01  0.36852E+00  0.28341E+01
 0.25961E+01
  EIGENVALUE( 3) =   0.214435E+08  SQRT(EGNVAL) =   0.46307E+04
  EIGENVECTOR:
 0.33199E+01  0.30852E+01  0.11524E+01  0.22275E+01 -0.22890E+01
-0.29397E+00 -0.34576E+01 -0.19843E+01 -0.19729E+01 -0.21800E+01
 0.62866E+00 -0.14576E+01  0.28498E+01 -0.57537E+00  0.40591E+01
 0.43662E+01
  EIGENVALUE( 4) =   0.150384E+08  SQRT(EGNVAL) =   0.38779E+04
  EIGENVECTOR:
 0.32637E+01  0.41756E+01  0.11157E+00  0.71009E+00 -0.32245E+01
-0.32013E+01 -0.14381E+01 -0.23993E+01  0.22852E+01  0.91312E+00
 0.31941E+01  0.27781E+01  0.76923E+00  0.20205E+01 -0.22830E+01
-0.35136E+01
  EIGENVALUE( 5) =   0.986575E+07  SQRT(EGNVAL) =   0.31410E+04
  EIGENVECTOR:
-0.28005E+01 -0.42831E+01  0.91260E+00  0.22507E+01  0.23708E+01
 0.31023E+01 -0.17241E+01 -0.24078E+01 -0.21324E+01 -0.28375E+01
 0.16444E+01  0.15988E+01  0.24435E+01  0.30429E+01 -0.78236E+00
-0.27990E+01
  EIGENVALUE( 6) =   0.630311E+07  SQRT(EGNVAL) =   0.25106E+04
  EIGENVECTOR:
-0.23542E+01 -0.34980E+01  0.15315E+01  0.42570E+01  0.58699E+00
-0.10505E+01 -0.22369E+01 -0.30966E+01  0.14144E+01  0.31738E+01
 0.12411E+01  0.10951E+01 -0.21688E+01 -0.34192E+01 -0.28335E+00
 0.22761E+01
  EIGENVALUE( 7) =   0.395513E+07  SQRT(EGNVAL) =   0.19888E+04
  EIGENVECTOR:
 0.19974E+01  0.20506E+01 -0.17655E+01 -0.37768E+01  0.96457E+00
 0.41093E+01  0.31131E+00 -0.24040E+01 -0.15274E+01 -0.74642E+00
 0.18559E+01  0.33028E+01 -0.82624E+00 -0.30778E+01 -0.94319E+00
 0.18694E+01
  EIGENVALUE( 8) =   0.245775E+07  SQRT(EGNVAL) =   0.15677E+04
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 EIGENVECTOR:
 0.17054E+01  0.23500E+00 -0.16937E+01 -0.98446E+00  0.16142E+01
 0.19935E+01 -0.14020E+01 -0.29866E+01  0.97721E+00  0.35754E+01
-0.31508E+00 -0.33504E+01 -0.49451E+00  0.20899E+01  0.12155E+01
-0.15227E+01
 EIGENVALUE( 9) =   0.151722E+07  SQRT(EGNVAL) =   0.12318E+04
 EIGENVECTOR:
-0.10767E+01  0.11718E+01  0.10542E+01 -0.18228E+01 -0.10194E+01
 0.21384E+01  0.10238E+01 -0.21917E+01 -0.10785E+01  0.20105E+01
 0.11777E+01 -0.15903E+01 -0.13004E+01  0.92178E+00  0.14095E+01
-0.14587E+01
 EIGENVALUE(10) =   0.795709E+06  SQRT(EGNVAL) =   0.89203E+03
 EIGENVECTOR:
 0.10299E+01 -0.30643E+01 -0.83827E+00  0.45612E+01  0.40224E+00
-0.47386E+01  0.57022E-01  0.40636E+01 -0.42801E+00 -0.29970E+01
 0.67592E+00  0.18604E+01 -0.81263E+00 -0.83027E+00  0.86865E+00
-0.88176E+00
 EIGENVALUE(11) =   0.414941E+06  SQRT(EGNVAL) =   0.64416E+03
 EIGENVECTOR:
 0.84504E+00 -0.41152E+01 -0.46812E+00  0.43420E+01 -0.27735E+00
-0.15365E+01  0.76359E+00 -0.18726E+01 -0.73365E+00  0.38884E+01
 0.30368E+00 -0.38528E+01  0.23832E+00  0.22305E+01 -0.63705E+00
 0.77611E+00
 EIGENVALUE(12) =   0.196401E+06  SQRT(EGNVAL) =   0.44317E+03
 EIGENVECTOR:
-0.69090E+00  0.46877E+01  0.15739E+00 -0.20840E+01  0.59973E+00
-0.30241E+01 -0.49540E+00  0.39097E+01 -0.23791E+00 -0.16960E+00
 0.65618E+00 -0.34563E+01 -0.32540E+00  0.32721E+01 -0.33061E+00
 0.64326E+00
 EIGENVALUE(13) =   0.795482E+05  SQRT(EGNVAL) =   0.28204E+03
 EIGENVECTOR:
-0.54468E+00  0.46819E+01 -0.68283E-01  0.11485E+01  0.52790E+00
-0.41230E+01  0.14778E+00 -0.12919E+01 -0.50434E+00  0.38653E+01
-0.13819E+00  0.88197E+00  0.50404E+00 -0.37595E+01  0.58942E-01
-0.51099E+00
 EIGENVALUE(14) =   0.250128E+05  SQRT(EGNVAL) =   0.15815E+03
 EIGENVECTOR:
 0.40335E+00 -0.41030E+01  0.18634E+00 -0.37600E+01 -0.23639E+00
 0.65094E+00 -0.39195E+00  0.40183E+01 -0.84566E-01  0.23210E+01
 0.32264E+00 -0.22133E+01  0.31013E+00 -0.36096E+01 -0.11661E+00
-0.38253E+00
 EIGENVALUE(15) =   0.491838E+04  SQRT(EGNVAL) =   0.70131E+02
 EIGENVECTOR:
-0.26464E+00  0.30178E+01 -0.19611E+00  0.44607E+01 -0.23545E-01
 0.35425E+01  0.16373E+00  0.75254E+00  0.26014E+00 -0.23137E+01
 0.20436E+00 -0.38242E+01  0.23827E-01 -0.28428E+01 -0.17198E+00
-0.25621E+00
 EIGENVALUE(16) =   0.302462E+03  SQRT(EGNVAL) =   0.17391E+02
 EIGENVECTOR:
-0.12713E+00  0.15509E+01 -0.11799E+00  0.28775E+01 -0.91589E-01
 0.37821E+01 -0.51213E-01  0.41221E+01 -0.23291E-02  0.38346E+01
 0.47892E-01  0.29522E+01  0.91545E-01  0.16042E+01  0.12131E+00
 0.13188E+00
Stop - Program terminated.
```