CIVE422 Assignment 4

Element Stiffness Matrix Verification

Matlab Text

**ELEMENT #1:**

alpha\_i =

27.3004

alpha\_j =

27.2998

alpha\_m =

-47.8460

beta\_i =

-3.0121

beta\_j =

1.6916

beta\_m =

1.3205

gamma\_i =

0.5528

gamma\_j =

-2.5528

gamma\_m =

2

A =

3.3771

B =

-0.4460 0 0.2505 0 0.1955 0

0 0.0818 0 -0.3780 0 0.2961

0.0818 -0.4460 -0.3780 0.2505 0.2961 0.1955

D =

1.0e+09 \*

1.2000 0.4000 0

0.4000 1.2000 0

0 0 0.4000

Ke =

1.0e+08 \*

8.1502 -0.9861 -4.9442 2.5538 -3.2060 -1.5677

-0.9861 2.9580 2.5538 -2.7624 -1.5677 -0.1956

-4.9442 2.5538 4.4717 -2.5574 0.4725 0.0036

2.5538 -2.7624 -2.5574 6.6365 0.0036 -3.8741

-3.2060 -1.5677 0.4725 0.0036 2.7335 1.5641

-1.5677 -0.1956 0.0036 -3.8741 1.5641 4.0697

**ELEMENT #2:**

alpha\_i =

-256.2795

alpha\_j =

-10.3611

alpha\_m =

363.6409

beta\_i =

10.7074

beta\_j =

-1.9804

beta\_m =

-8.7270

gamma\_i =

-2.5702

gamma\_j =

9.5346

gamma\_m =

-6.9644

A =

48.5002

B =

0.1104 0 -0.0204 0 -0.0900 0

0 -0.0265 0 0.0983 0 -0.0718

-0.0265 0.1104 0.0983 -0.0204 -0.0718 -0.0900

D =

1.0e+09 \*

1.2000 0.4000 0

0.4000 1.2000 0

0 0 0.4000

Ke =

1.0e+08 \*

7.2278 -1.1348 -1.8169 2.2099 -5.4109 -1.0751

-1.1348 2.7725 2.2099 -1.9530 -1.0751 -0.8194

-1.8169 2.2099 2.1170 -0.7787 -0.3001 -1.4312

2.2099 -1.9530 -0.7787 5.7041 -1.4312 -3.7510

-5.4109 -1.0751 -0.3001 -1.4312 5.7109 2.5063

-1.0751 -0.8194 -1.4312 -3.7510 2.5063 4.5705

**ELEMENT #3:**

alpha\_i =

1.3179e+03

alpha\_j =

-737.0820

alpha\_m =

-384.4320

beta\_i =

-7.7099

beta\_j =

15.5754

beta\_m =

-7.8655

gamma\_i =

-10.9820

gamma\_j =

-3.2907

gamma\_m =

14.2727

A =

98.2100

B =

-0.0393 0 0.0793 0 -0.0400 0

0 -0.0559 0 -0.0168 0 0.0727

-0.0559 -0.0393 -0.0168 0.0793 0.0727 -0.0400

D =

1.0e+09 \*

1.2000 0.4000 0

0.4000 1.2000 0

0 0 0.4000

Ke =

1.0e+08 \*

3.0438 1.7243 -3.3002 -1.4833 0.2564 -0.2409

1.7243 4.2893 -1.4833 -0.1188 -0.2409 -4.1705

-3.3002 -1.4833 7.5207 -1.0438 -4.2205 2.5271

-1.4833 -0.1188 -1.0438 2.8009 2.5271 -2.6821

0.2564 -0.2409 -4.2205 2.5271 3.9640 -2.2862

-0.2409 -4.1705 2.5271 -2.6821 -2.2862 6.8526