REFERENCES


APPENDIX 1

CONSTRAINT EQUATIONS ON UNKNOWN COEFFICIENTS FOR THE DEVELOPMENT OF PLANE STRESS ELEMENT - SFCNQ (REF 3.2.1)

\[ \begin{align*}
2a_5 + vb_4 + r(2a_6 + b_4) &= 0 \quad (A1.1) \\
2b_6 + va_4 + r(2b_5 + a_4) &= 0 \quad (A1.2) \\
3a_9 + vb_7 + r(a_8 + b_7) &= 0 \quad (A1.3) \\
b_8 + va_7 + r(3b_9 + a_7) &= 0 \quad (A1.4) \\
a_7 + vb_8 + r(3a_{10} + b_8) &= 0 \quad (A1.5) \\
3b_{10} + va_8 + r(a_8 + b_7) &= 0 \quad (A1.6) \\
3a_{12} + 2vb_{11} + r(3a_{13} + 2b_{11}) &= 0 \quad (A1.7) \\
3b_{13} + 2va_{11} + r(3b_{12} + 2a_{11}) &= 0 \quad (A1.8) \\
12a_{14} + 3vb_{12} + r(2a_{11} + 3b_{12}) &= 0 \quad (A1.9) \\
2b_{11} + 3vb_{13} + r(12b_{14} + 3a_{12}) &= 0 \quad (A1.10) \\
2a_{11} + 3vb_{13} + r(12a_{15} + 3b_{13}) &= 0 \quad (A1.11) \\
12b_{15} + 3va_{13} + r(2b_{11} + 3a_{13}) &= 0 \quad (A1.12)
\end{align*} \]

Where \( \nu \) is the poisson’s ratio and \( r = (1 - \nu)/2 \)

Constraint equations A1.1 and A1.2 are obtained by equating the constant coefficients of the two stress field equilibrium equations equal to zero. Equations A1.3 and A1.4 are obtained by equating the coefficients of \( x \) equal to zero. Equations A1.5 and A1.6 are obtained by equating the coefficients of \( y \) equal to zero. Equations A1.7 and A1.8 are obtained by equating the coefficients of \( x^2 \) equal to zero. Equations A1.9 and A1.10 are obtained by equating the coefficients of \( y^2 \) equal to zero. Equations A1.11 and A1.12 are obtained by equating the coefficients of \( xy \) equal to zero.
APPENDIX 2

CONSTRAINT EQUATIONS ON UNKNOWN COEFFICIENTS FOR THE DEVELOPMENT OF THREE DIMENSIONAL ELEMENT - SFCSS (REF 3.3.1)

\[\begin{align*}
2p_1a_5 + p_2b_6 + p_2c_7 + 2p_3a_8 + p_3b_6 + p_3c_7 + 2p_3a_{10} &= 0 \quad (A2.1) \\
2p_1b_8 + p_2a_6 + p_2c_9 + 2p_3b_{10} + p_3c_9 + p_3a_6 + 2p_3b_5 &= 0 \quad (A2.2) \\
2p_1c_{10} + p_2b_9 + p_2a_7 + 2p_3c_5 + p_3a_7 + p_3b_9 + 2p_3c_8 &= 0 \quad (A2.3) \\
6p_1a_{11} + 2p_2b_{12} + 2p_2c_{13} + 2p_3a_{16} + 2p_3b_{12} + 2p_3c_1 + 2p_3a_{19} &= 0 \quad (A2.4) \\
2p_1b_{16} + 2p_2a_{12} + p_2c_{14} + 2p_3b_{19} + p_3c_{14} + 2p_3a_{12} + 6p_3b_{11} &= 0 \quad (A2.5) \\
2p_1c_{19} + p_2b_{14} + 2p_2a_{13} + 6p_3c_{11} + 2p_3a_{13} + p_3b_{14} + 2p_3c_{16} &= 0 \quad (A2.6) \\
2p_1a_{12} + 2p_2b_{16} + p_2c_{14} + 6p_3a_{15} + 2p_3b_{16} + p_3c_{14} + 2p_3a_{20} &= 0 \quad (A2.7) \\
6p_1b_{15} + 2p_2a_{16} + 2p_2c_{17} + 2p_3b_{20} + 2p_3c_{17} + 2p_3a_{16} + 2p_3b_{12} &= 0 \quad (A2.8) \\
2p_1c_{20} + 2p_2c_{17} + p_2a_{14} + 2p_3c_{12} + p_3a_{14} + 2p_3b_{17} + 6p_3c_{15} &= 0 \quad (A2.9) \\
2p_1a_{13} + p_2b_{14} + 2p_2c_{19} + 2p_3a_{17} + p_3b_{14} + 2p_3c_{19} + 6p_3a_{18} &= 0 \quad (A2.10) \\
2p_1b_{17} + p_2a_{14} + 2p_2c_{20} + 6p_3b_{18} + 2p_3c_{20} + p_3a_{14} + 2p_3b_{13} &= 0 \quad (A2.11) \\
6p_1c_{18} + 2p_2b_{20} + 2p_2a_{19} + 2p_3c_{13} + 2p_3a_{19} + 2p_3b_{20} + 2p_3c_{17} &= 0 \quad (A2.12)
\end{align*}\]

Where \( p_1 = \frac{E\nu}{(1+\nu)(1-2\nu)} + \frac{E}{(1+\nu)} \), \( p_2 = \frac{E\nu}{(1+\nu)(1-2\nu)} \) and \( p_3 = \frac{E}{(1+\nu)} \).

Constraint equations A2.1, A2.2 and A2.3 are obtained by equating the constant coefficients of the three stress field equilibrium equations equal to zero. Equations A2.4, A2.5 and A2.6 are obtained by equating the coefficients of \( x \) equal to zero. Equations A2.7, A2.8 and A2.9 are obtained by equating the coefficients of \( y \) equal to zero. Equations A2.10, A2.11 and A2.12 are obtained by equating the coefficients of \( z \) equal to zero.
PUBLICATIONS BASED ON THE RESEARCH WORK


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