Linear Elasticity: Putting It All Together

Step 1: Initialize the Problem

Set $p_1, p_2, n_1, n_2, \vec{\Xi}_1, \vec{\Xi}_2, \{\vec{P}_i\}_{i=1}^{n}, \{w_i\}_{i=1}^{n}$

Call Extract And Localize to obtain $n_{el}, \{\underline{C}^e\}_{e=1}^{n_{el}}$, IEN, $\{\{\vec{P}_a^{b,e}\}\}$, $\{\{w_a^{b,e}\}\}$, $\{\{\vec{P}_a^e\}\}$, $\{\{w_a^e\}\}$

Same as in setting of heat conduction

Set $n_q, \{\tilde{\xi}_q\}_{q=1}^{n_q}, \{\tilde{w}_q\}_{q=1}^{n_q}$

Construct ID and LM arrays

Construct BC and Neumann arrays

Construct g_A, $A = 1, \ldots, d$ (vectors with Dirichlet data)

Step 2: Construct the Matrix System

Set $\underline{\underline{K}} = \underline{\underline{0}}$ and $\underline{F} = \underline{0}$

for $e = 1, \ldots, n_{el}$

Follows pseudocode from "Linear Elasticity: Constructing..."

Call Element Formation to obtain $\underline{\underline{k}}^e$ and $\underline{F}^e$

Call Element Assembly to obtain updated $\underline{\underline{K}}$ and $\underline{F}$

Follows pseudocode from "Linear Elasticity: Assembling..."

endloop

Step 2.1: Account for BCs

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for i=1,...,n
    ←for A=1,...,d
        if BC(A,i) = 1
            Set P = ID(A,i)
            Set Kpp = 1
            Set Fp = (g_i)_A
        endif
    endloop
endloop
```

Step 3: Solve the Matrix System

Solve $\underline{d} = \underline{\underline{K}}^{-1}\underline{F}$

Step 4: Analyze Results