MECH 5130 Theory of Finite Element Method
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Homework 0: FOR loops

(1) (Optional) Write out all components (no vector or matrix operations, only using indices) of the following operations (all matrices are 3 x 3 and vectors are 3 x 1):

a. $\{a\}^T\{b\} =?$

b. $[A]\{a\} =?$

c. $\{a\}^T[A]\{b\} =?$

d. $[A][B] =?$

e. $[A][B]^T =?$

(2) In Matlab, python, or your preferred language, solve a) - e) using only +, -, and * operators and **for** loops. Do not use any matrix or vector functions. Use:

$$[A] = \begin{bmatrix} 3 & 5 & 6 \\ 7 & 1 & 9 \\ 0 & 4 & 6 \end{bmatrix}, [B] = \begin{bmatrix} 1 & 0 & 1 \\ 4 & 2 & 0 \\ 2 & 0 & 0 \end{bmatrix}, \{a\} = \begin{Bmatrix} 1 \\ 2 \\ 0 \end{Bmatrix}, \{b\} = \begin{Bmatrix} 3 \\ 97.95 \\ 2 \end{Bmatrix}$$