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Appendix

In Eq. (8), $\boldsymbol{m}_{\mathrm{I}}$ and $\boldsymbol{m}_{\mathrm{II}}$ arethe mass matrixwhile $\boldsymbol{k}_{\mathrm{I}}$ and $\boldsymbol{k}_{\mathrm{II}}$ arethe stiffness matrix for element dynamics equations (Eq. (6) and Eq. (7)), those matrix is computed with the following equations:

$$\boldsymbol{m}_{\mathrm{I}}=\frac{m_{IG}}{420}\begin{bmatrix}
140 & & & 70 & & & & & & & & \\
 & 156 & 22l_{GH} & & 54 & -13l_{GH} & & & & & & \\
 & 22l_{GH} & 4l_{GH}^2 & & 13l_{GH} & -3l_{GH}^2 & & & & & & \\
70 & & & 140 & & & & & & & & \\
 & 54 & 13l_{GH} & & 156 & -22l_{GH} & & & & & & \\
 & -13l_{GH} & -3l_{GH}^2 & & -22l_{GH} & 4l_{GH}^2 & & & & & & \\
 & & & & & & 140 & & & 70 & & \\
 & & & & & & & 156 & 22l_{IH} & & 54 & -13l_{IH} \\
 & & & & & & & 22l_{IH} & 4l_{IH}^2 & & 13l_{IH} & -3l_{IH}^2 \\
 & & & & & & 70 & & & 140 & & \\
 & & & & & & & 54 & 13l_{IH} & & 156 & -22l_{IH} \\
 & & & & & & & -13l_{IH} & -3l_{IH}^2 & & -22l_{IH} & 4l_{IH}^2
\end{bmatrix}$$