$NLA_{Method1} :=$

"This routine performs an iterative, nonlinear structural analysis of a steel pile embedded in an unreinforced concrete beam."

"1-D link elements with full length, linear tranction forces (peak at the pile face) to model the 3-D connection"

"behavior through the PSTB. These elements yield larger stresses and translations at the pile face than those calculeted utilizing"

"the elements in Methods 2 and 3."

"Refer to the MBeam routine above for the Cap Bending Scenario being considered."

for $j \in 1..NoPileForceEvaluationPoints$

$Count_{1,j} \leftarrow 0$

$Q_{Total} \leftarrow matrix(DOFS, 1, f(i,j) \leftarrow 0)$

$Q_{PileFace} \leftarrow matrix(DOFS, 1, f(i,j) \leftarrow 0)$

$ReactionError \leftarrow 1$

while $ReactionError \geq 0.001$

$\Delta_{Global}^{\langle j \rangle} \leftarrow \left(K_{GlobalComplete}^{-1}\right) \cdot \left(F_{Pile}^{\langle j \rangle} + Q_{PileFace}\right)$

$P_{PileFace} \leftarrow K_{GlobalSpringsOnly} \cdot \Delta_{Global}^{\langle j \rangle} - Q_{PileFace}$

for $i \in 1..\frac{DOFS}{2}$

$ReactionAtIdealizedBeam_{i,j} \leftarrow P_{PileFace_{2 \cdot i-1}} - Q_{Total_{2 \cdot i-1}}$ if $P_{PileFace_{2 \cdot i-1}} \geq 0$

$ReactionAtIdealizedBeam_{i,j} \leftarrow P_{PileFace_{2 \cdot i-1}} + Q_{Total_{2 \cdot i-1}}$ if $P_{PileFace_{2 \cdot i-1}} < 0$

$ReactionError_{i,j} \leftarrow ReactionAtIdealizedBeam_{i,j} + P_{CapFbrLeft_{i,j}}$ if $P_{PileFace_{2 \cdot i-1}} \geq 0$

$ReactionError_{i,j} \leftarrow ReactionAtIdealizedBeam_{i,j} - P_{CapFbrRight_{i,j}}$ if $P_{PileFace_{2 \cdot i-1}} < 0$

$Q_{TotalNew_{i,j}} \leftarrow Q_{Total_{2 \cdot i-1}} - ReactionError_{i,j}$

$Q_{PileFaceNew_{i,j}} \leftarrow Q_{PileFace_{2 \cdot i-1}} - \frac{1}{3} \cdot ReactionError_{i,j}$

$ReactionError$

$REMin \leftarrow |min(ReactionError)|$

$REMax \leftarrow max(ReactionError)$

$ReactionError \leftarrow max(REMin, REMax)$

$Q_{TotalNew}$

$Q_{PileFaceNew}$

$Q_{Total} \leftarrow matrix(DOFS, 1, f(i,j) \leftarrow 0)$

$Q_{PileFace} \leftarrow matrix(DOFS, 1, f(i,j) \leftarrow 0)$

for $i \in 1..\frac{DOFS}{2}$

$Q_{Total_{2 \cdot i-1}} \leftarrow Q_{TotalNew_{i,j}}$

$Q_{PileFace_{2 \cdot i-1}} \leftarrow Q_{PileFaceNew_{i,j}}$

Q_{Total}

$Q_{PileFace}$

$m \leftarrow 1..\frac{DOFS}{2}$

$SumMoments_{1,j} \leftarrow \sum_m \left[\left(P_{PileFace_{2 \cdot m-1}}\right) \cdot (m-1) \cdot \left(L_{PE}\right)\right] - F_{Pile_{2,j}}$

$SumShears_{1,j} \leftarrow \sum_m \left(P_{PileFace_{2 \cdot m-1}}\right) - F_{Pile_{1,j}}$

$Count_{1,j} \leftarrow Count_{1,j} + 1$

return "Iteration Limit Exceeded" if $Count_{1,j} > 1000$

$Count$

$SumMoments$

$SumShears$

Δ_{Global}

$CombinedResults \leftarrow stack\left(Count, SumMoments, SumShears, \Delta_{Global}\right)$