# Application of Macro Element in Finite Element Analysis

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## Summary

Generally, the computational efficiency in numerical analysis is dependant on the degree of freedom in the model under investigation. To reduce computational cost without altering the accuracy of numerical findings, an algorithm is introduced in this manuscript to develop macro element. When this method is incorporated into finite element analysis, all the members in the nonlinear zones of a structure can be grouped into just one macro element. With the presence of weak member method, the stiffness matrix of this macro element can be evaluated through analyzing the response of the original structure induced by a series of fictitious unit forces applied to the nodes shared by linear and nonlinear zones. Numerical example shows that the computational efficiency can be improved significantly by the proposed approach.