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CIVIL ENGINEERING

## : MAJOR

KEY WORD: SPACE FRAMES / NONLINEAR / PLASTIC

TSIADEE SINGSILARAK : GEOMETRICALLY NONLINER ANALYSIS OF ELASTIC-PLASTIC SPACE  
FRAMES. THESIS ADVISOR : PROF. DR.VINIT CHOVICHEN,Ph.D. 222PP. ISBN 974-636-671-8

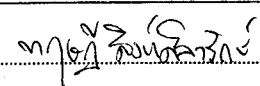
The research presents a method for geometically nonlinear analysis of elastic-plastic space frames. A nonlinear stiffness matrix was derived from the theorem of least work , where the effects of large joint translation and rotations are taken into account. The force-deformation relationship of a local member is based on the slope-deflection theory of which the changes in member chord length, caused by axial force strain and flexural bowing are taken into account. The deflection shape was assumed to be a third polynomial. A new matrix transformed Eulerian coordinate to Lagrange coordinate was proposed. The transformation matrix is highly accurate in small deformation in one plane whereas the deformation in another plane can be large deformation. The transformation matrix is orthogonal ,based on two dimensional of analysis. In the nonlinear material analysis ,load factor was solved by using equilibruim method. The solution of plastic hinge of a wide flange was presented ,based on a general formulation of rectangular section proposed by Bruinette. The computation technique used in the research was Newton-Raphson method. Numerical solutions for three structures indicated that there is approximately 10 percent error in the pre-buckling stage.

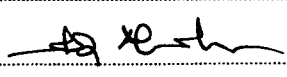
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