Large Increment Method: A Force Based Method for Parallel Computation

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The Large Increment Method (LIM) is introduced for elastoplastic continua and structures. In LIM, the generalized forces of elements are chosen as system unknowns. The generalized inverse matrix theory is employed to solve the non-square equilibrium matrix. The constitutive equations and compatibility equations are rewritten as optimization target. The iteration procedures are divided into two stages: the global stage and the local stage. During the local stage, the constitutive equations of every element are processed and parallel computation can be performed in the spatial domain. While during the global stage, the equilibrium equations and the compatibility equations are examined at every time point and parallel computation can be implemented in the time domain. Some numerical examples are provided to show the accuracy of the proposed method.

Keywords: Force method, Elastoplasticity, Parallel computation, Generalized inverse matrix