Study on Sharp V-Notch Problem under Dynamic Loading Condition Using Symplectic Analytical Singular Element

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Abstract : V-notch problem under dynamic loading condition is considered in this paper. In the time domain, the precise time domain expanding algorithm is employed, in which a self-adaptive technique is carried out to improve computing accuracy. By expanding variables in each time interval, the recursive finite element formulas are derived. In the space domain, a Symplectic Analytical Singular Element (SASE) for V-notch problem is constructed addressing the stress singularity of the notch tip. Combining with the conventional finite elements, the proposed SASE can be used to solve the dynamic stress intensity factors (DSIFs) in a simple way. Numerical results show that the proposed SASE for V-notch problem subjected to dynamic loading condition is effective and efficient.