ELASTO-PLASTIC ANALYSIS USING QUADRILATERAL ELEMENTS WITH MIDSIDE INTEGRATION POINTS

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Abstract. In this work we present an alternative integration rule for quadrilateral finite elements in elasto-plasticity using midside integration points. Using these points have some advantages with respect to conventional Gauss points. A better capture of the advancing plastic front is obtained. Also the maximum deformations in each element are better predicted. A more direct correlation is obtained with fatigue and fracture phenomena which usually begin at the boundary. Also some economy can be gained in the computations since midside integration points are shared by adjacent elements and the constitutive information is not duplicated.