

On the increase of accuracy in numerical modelling of metal plasticity

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SUMMARY

A yield criterion is proposed suitable for accurate numerical modelling of metal plasticity when there are deviations from classical theories in the actual yield curve. The new criterion is obtained by enhancing the von Mises yield curve with a trigonometric series in the deviatoric plane. Limits for the admissible values of correction amplitudes in the sense of convexity postulate are given for lower numbers of correction harmonics. Consistent tangent material matrix is derived in the form suitable for incorporating the proposed yield criterion. An example presenting a perforated tension strip demonstrates the influence of the yield function's deviation from von Mises theory on the calculated displacements and spread of the plastic zones. No significant loss in computational performance is recorded when von Mises is replaced by the new yield criterion.
