Unified viscoplasticity modelling and its application to fatigue-creep behaviour of gas turbine rotor

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Highlights

- An elasto-visco-plastic finite element modelling framework was developed including the associated UMAT codes.
- A 3D framework computational methodology following an implicit formulation and based on a radial return mapping algorithm was used.
- The methodology was applied to a classical industrial gas turbine rotor to study deformation mechanisms
- The effects of thermal transients and geometry singularities on the development of residual stresses was discussed.