

# **Numerical modeling of large elastoplastic strains in terms of principal stretches. I. kinematics of elastoplastic strains**

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## **Abstract**

A technique for numerical finite element analysis of large elastoplastic strains is proposed. A problem is formulated in terms of principal stretches and their logarithms in the current basis of the left distortion tensor. It is shown that the "classical" multiplicative decomposition of the total strain gradient into the product of elastic and plastic strain gradients is equivalent to the presentation of total stretches as a product of elastic and plastic stretches. © Allerton Press, Inc., 2010.

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## **Keywords**

Finite strains, Multiplicative decomposition of strain gradient, Polar decomposition, Principal stretches