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Autofrettage of nonlinear strain-hardening cylinders using the proposed analytical solution for stresses

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Highlights

- A simple mathematical model was proposed such that it is able to capture the uniaxial experimental data from perfect plastic to the high nonlinearity strain-hardening level.
- An closed-form elastoplastic solution was determined to define the residual stresses distribution for a nonlinear strain-hardening cylinder.
- In order to strengthen the nonlinear strain-hardening cylinder while increasing strength-to-weight ratio, the required level of autofrettage is determined knowing the dimensions and working pressure.
- Design process of the nonlinear strain-hardening cylinder was done with the aim of increasing strength-to-weight ratio and preventing failure in working condition

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