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STRAIN LOCALIZATION ANALYSIS
USING A LARGE STRAIN SELF-CONSISTENT APPROACH

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Mechanisms of ductility loss

- Plastic mechanisms of ductility loss
- Structural origin: wrinkling, buckling
- Material origin: localization, necking

Aims of the study

- Ductility loss prediction for steels and sequential strain paths
- Optimization of microstructural properties for the sheet forming steels
- Steel behaviour during sheet forming: hardening, complex loads, instabilities, anisotropy
- Three main steps:
  - Single crystal modeling,
  - Scale transition,
  - Ductility loss criterion

Multiscale model with intragranular modeling

- Reproduces correctly the intragranular microstructure during monostatic and sequential loading paths
- Gives better results concerning macroscopic behavior during changing loading paths than model without intragranular modeling

Conclusions

- Reproduces correctly the shape and the level of direct FLD for mild steel and dual phase
- Reproduces the strain-path dependence of complex FLD