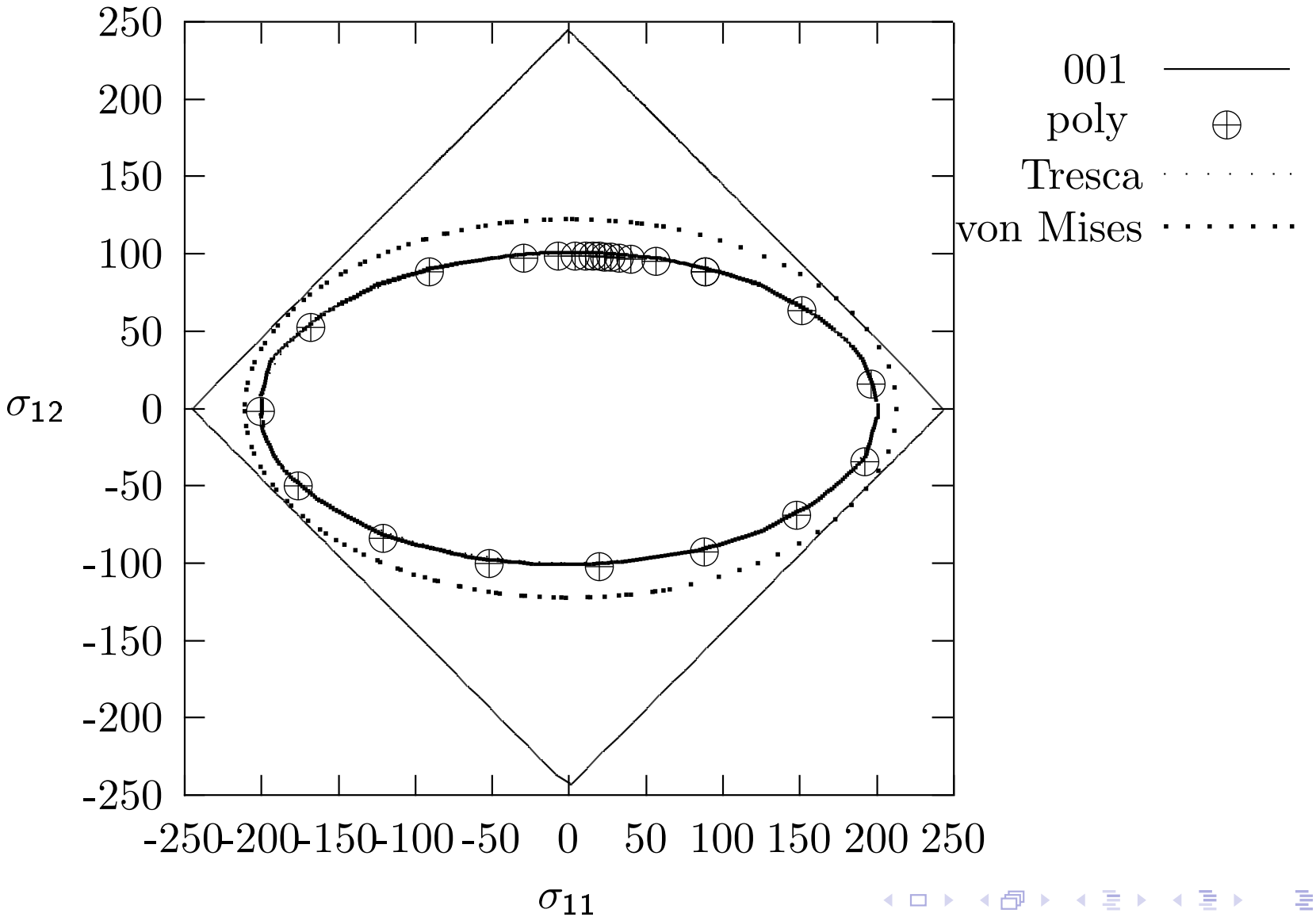
Yield surface of a polycrystalline aggregate

- A polycrystalline aggregate is simulated by a reduced number of grains, whose orientation is given by 3 *Euler angles* with respect to the laboratory frame (ϕ_1, Φ, ϕ_2). They define successively a rotation around x_3 axis, then around the new x_1' axis, and last around the new x_3'' axis. The orientations are randomly generated.
- Elasticity is assumed to be homogeneous in the aggregate (cubic elasticity is not taken into account), in order to have a uniform stress field in all the grains as long as the elastic yield is not reached.
- Unlike the case of Directionally Solidified material, the various grains introduce new slip configurations in space, so that the transition to the Tresca criterion is rapidly achieved in both planes, (σ_{33}–σ_{13}) and (σ_{11}–σ_{12}). For the 100 grain calculations on the next pages, the result is practically the same as Tresca criterion (it means that, whatever the loading state, there is now at least one slip system that is in an easy slip configuration).
- This document offers two simulation examples:
  - SEE σ_{11}–σ_{12} pour 100 grains – SEE σ_{33}–σ_{13} pour 100 grains
  - . . . and provides a link to perform new computations: *GO*

Yield surface for a polycristalline aggregate with 100 orientations



Yield surface for a polycrystalline aggregate with 100 orientations