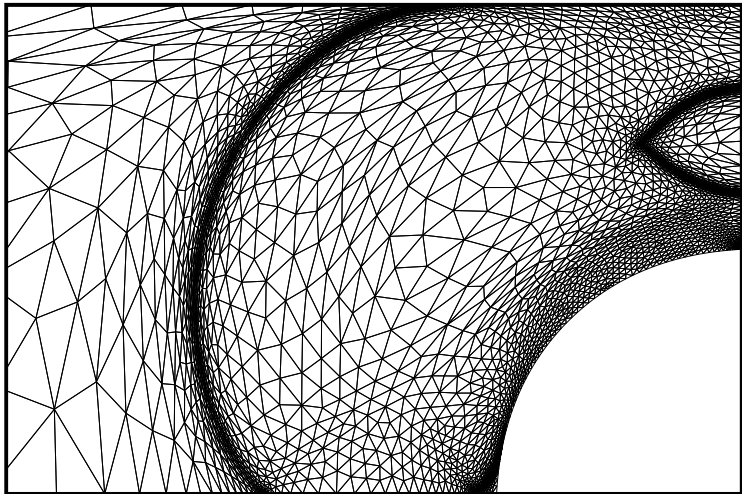
Numerical algorithms for viscoplastic fluids

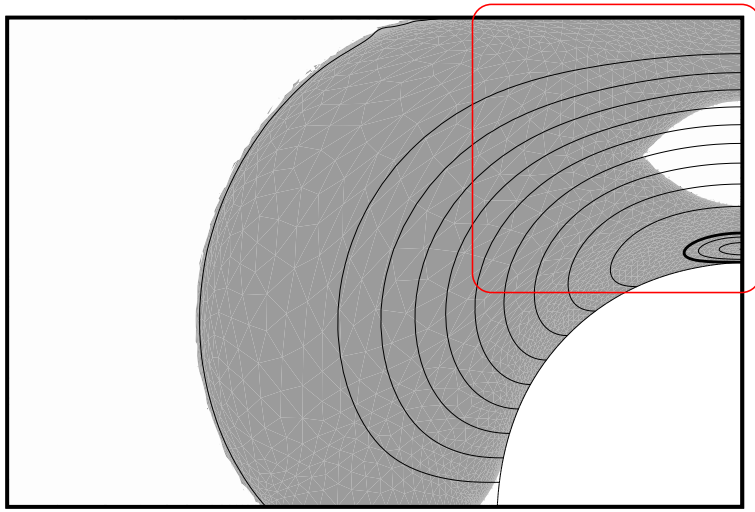
$$\min_{u \in H_0^1(\Omega} J(u)$$

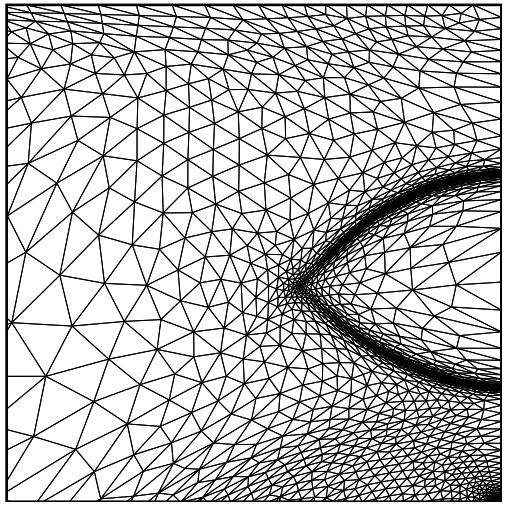
$$J(u) = \int_\Omega |\nabla u|^2 \, \mathrm{d}x + \sigma_0 \int_\Omega |\nabla u| \, \mathrm{d}x - \int_\Omega f u \, \mathrm{d}x$$

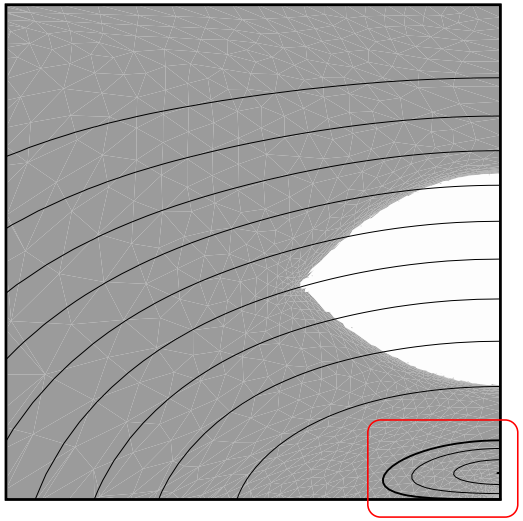
min : J is non-differentiable : $j(x) = x^2 + \sigma_0 |x| - fx$

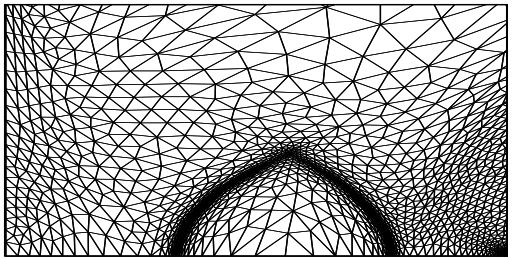
- operator splitting
- automatic adaptive mesh

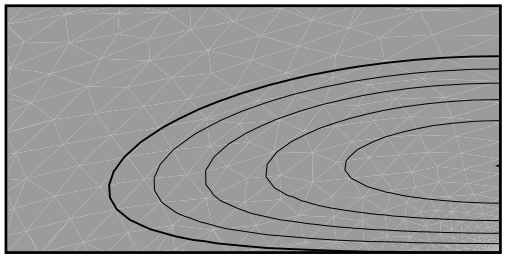
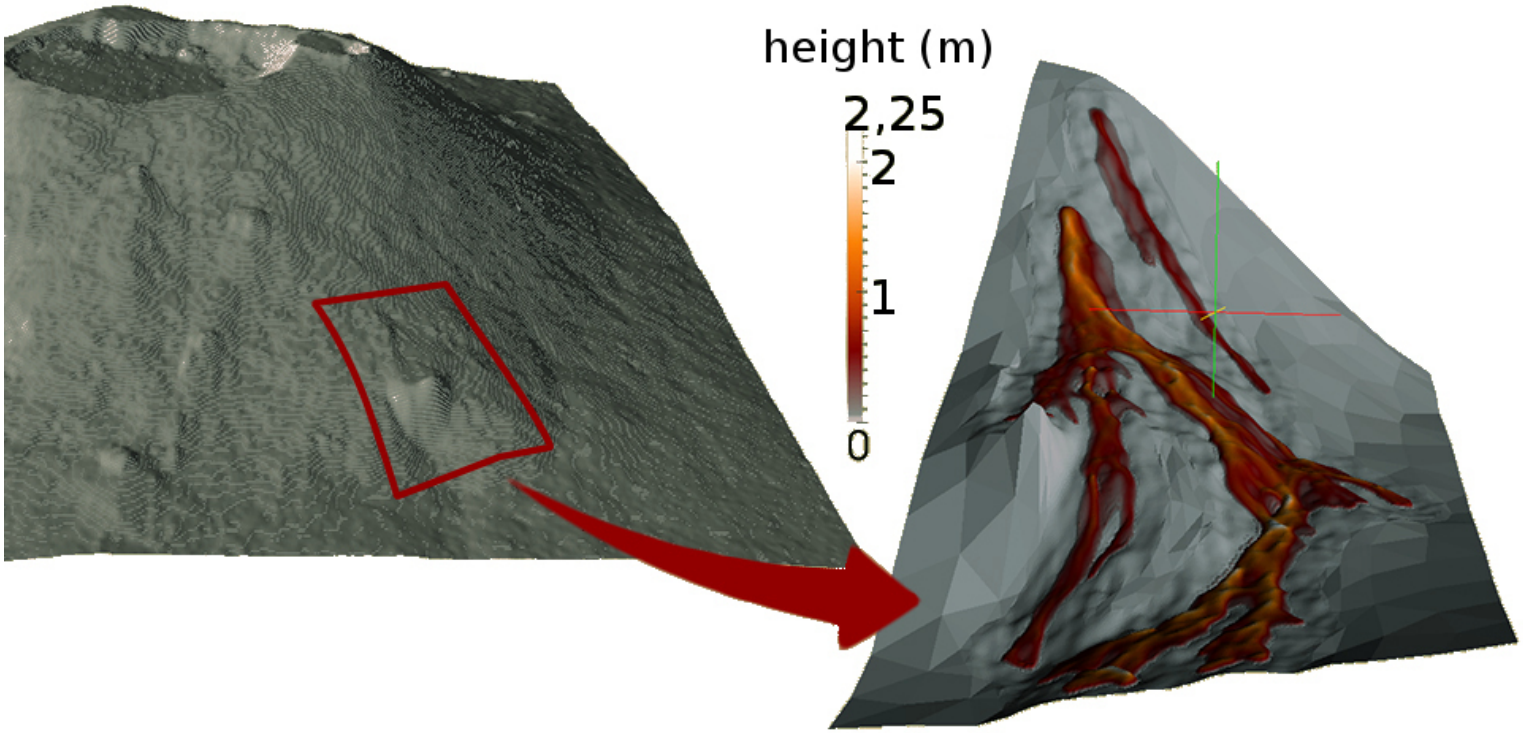












Volcanic lava flow simulation