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Topology optimization of nonlinear structures in industrial context

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The TOP project, housed by IRT SystemX, gathered between 2018 and 2021 some prominent industrial companies (Renault, Airbus, Safran,...) and some academics on various developments of the level set method for shape and topology optimization of structures in industrial context.

One of the topics considered was nonlinear mechanics, namely plasticity and fracture. Both problems are not shape-differentiable and need to be regularized and penalized in order to be addressed by the shape optimization algorithms. We will present the techniques used to tackle the problems, and some numerical simulations.

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