

# Least-Squares Finite Element Methode for a non-linear Sea-Ice problem

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A nonlinear sea-ice problem is considered in a least-squares finite element setting. The corresponding variational formulation approximating simultaneously the stress tensor and the velocity is analysed. In particular, the least-squares functional is coercive and continuous in an appropriate solution space. As the method does not require a compatibility condition between the finite element space, the formulation allows the use of piecewise polynomial spaces of the same approximation order for both the stress and the velocity approximations. A Newton-type iterative method is used to linearize the problem and numerical tests are provided to illustrate the theory.

## References:

- [1] <https://arxiv.org/abs/2305.11635>
- [2] <https://doi.org/10.1002/pamm.201800450>

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