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Ambrosio-Tortorelli approach to topological singularities and connections with jump minimizing liftings

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We study the Gamma-convergence of Ambrosio-Tortorelli-type functionals, for maps u defined on an open bounded set $\Omega \subset \mathbb{R}^n$ and taking values in the unit circle $S^1 \subset \mathbb{R}^2$. Depending on the domain of the functional, two different Gamma-limits are possible, one of which is nonlocal, and related to the notion of jump minimizing lifting, i.e., a lifting of a map u whose measure of the jump set is minimal. The latter requires ad hoc compactness results for sequences of liftings which, besides being interesting by themselves, also allow to deduce existence of a jump minimizing lifting. This is based on a joint work with Giovanni Bellettini and Riccardo Scala.

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