

Numerical Approximation of Rate-Independent Evolutions

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Abstract: We present a discretization of a rate-independent evolution governed by a non-convex energy functional. While standard continuous and piecewise linear finite elements are used for the discretization in space, we employ a tailored local minimization algorithm for the discretization w.r.t. time. It is shown that sequences of discrete solutions converge to so called parametrized solutions, as the mesh size tends to zero. This solution concept, that also arise via a vanishing viscosity analysis, allows for solutions which are discontinuous in time. A numerical example shows that our algorithm is able to approximate solutions providing a time discontinuity.

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