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Juraj Foldes* (foldes@virginia.edu), **Denis Bonheure**, **Hugo Tavares**, **Alberto Saldana** and **Ederson Moreira dos Santos**. *Uniqueness of critical points and applications to evolution problems.*

In order to understand the evolution of a system, it is critical to investigate stability properties of equilibria. These are often characterized as minimizers or critical points of certain functionals such as energy, entropy etc. Although basic properties include their existence, uniqueness, and regularity of critical points, the literature provide only very basic criteria for the uniqueness . To close this gap, we prove a unified and general criterion for the uniqueness of critical points of a functional in or without the presence of constraints such as positivity, boundedness, or fixed mass. Our method relies on convexity properties along suitable paths and significantly generalizes well-known uniqueness theorems. Due to the flexibility in the construction of the paths, our approach does not depend on the convexity of the domain and can be used to prove uniqueness in subsets, even if it does not hold globally. The results apply to all critical points and not only to minimizers, thus they provide uniqueness of solutions to the corresponding Euler-Lagrange equations. (Received February 12, 2018)