

**A weaker notion of convexity for Lagrangians  
not depending solely on velocities and positions**

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In dynamical systems, one often encounters actions  $A \equiv \int_{\Omega} L(x, v(x)) \rho dx$  which depend only on  $v$ , the velocity of the system and on  $\rho$  the distribution of the particles. In this case, it is well-understood that convexity of  $L(x, \cdot)$  is the right notion to study variational problems. In this talk, we consider a weaker notion of convexity which seems appropriate when the action depends on other quantities such as electro-magnetic fields. Thanks to the introduction of a gauge, we will argue why our problem reduces to understanding the relaxation of a functional defined on the set of differential forms (Joint work with B. Dacorogna).