

In Between Energetic and Balanced Viscosity solutions of rate-independent systems: the Visco-Energetic concept, with some applications to solid mechanics

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This talk focuses on weak solvability concepts for rate-independent systems. Visco-Energetic solutions have been recently obtained by passing to the time-continuous limit in a time-incremental scheme, akin to that for Energetic solutions, but perturbed by a ‘viscous’ correction term, as in the case of Balanced Viscosity solutions. However, for Visco-Energetic solutions this viscous correction is tuned by a fixed parameter. The resulting solution notion is characterized by a stability condition and an energy balance analogous to those for Energetic solutions, but, in addition, it provides a fine description of the system behavior at jumps as Balanced Viscosity solutions do. Visco-Energetic evolution can be thus thought as ‘in-between’ Energetic and Balanced Viscosity evolution.

We will explore these aspects in a general metric framework. We will then illustrate the application of the Visco-Energetic concept to models for damage and finite-strain plasticity. Joint work with Giuseppe Savaré.