A variational interpretation of the Banach contraction principle and its surprising consequences for Differential Equations

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The classical contraction principle is one of those basic results in Analysis with many fundamental applications. In this talk, we will examine a variational interpretation of it which turns out to be more flexible. In particular, it can be used to deal with situations where existence and uniqueness of solutions is known or expected. Though many classical situations can be treated, due to time restrictions we will focus on two representative examples: that of initial-value Cauchy problems for autonomous ODE systems, and the case of non-linear, non-variational monotone PDE equations in divergence form. It remains to be seen if this perspective could help in new situations. The tone of the talk will be elementary. No specialized background is required.

February 19, 2025 | 17:00 – 18:00
Instituto Superior Técnico, Campus Alameda
Room PA2