

## A FUNDAMENTAL LEMMA REVISITED

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A fundamental lemma of Jacques-Louis Lions asserts that, if a distribution defined on a bounded open subset of  $\mathbb{R}^n$  has its first-order derivatives in  $H^{-1}$ , then the distribution is in  $L^2$ . It is well-known that this lemma is the key to proving Korn's inequality, and to proving the existence of a solution to the Stokes equations once combined with the Babuska-Brezzi inf-sup theorem. But it has been recently shown that this lemma is in fact of wider applicability, as the key to also proving a weak Poincaré lemma, a weak Saint-Venant lemma, and a Donati-like compatibility theorem. This lecture will provide a brief overview of these results, and will show how the more recent ones provide a mathematical justification of the emerging—and sometimes intriguing—field of intrinsic elasticity.