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Non-linear systems of PDEs. Two examples from applications.

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Abstract Except for those cases systematically studied (Navier-Stokes and variants, linear elasticity and dynamic variations, reaction-diffusion systems based on the laplacian, etc), fully non-linear systems of PDEs are feared by its intrinsic nature. Starting from the vector variational method as the main technique to show existence of solutions, we will describe, briefly and in a non-technical manner, the main points and difficulties of this method. To avoid being lost among generalities and subtleties, we will focus, depending on time, on two explicit examples where these non-linear systems are essential: one focuses on the modeling and control of soft robots; the other one is intimately related to the classical inverse problem in conductivity in the plane.

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