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Lagrangian and semi-Lagrangian Galerkin methods for solving continuum mechanics problems

We present a unified approach to state and analyze Pure Lagrangian and Semi-Lagrangian methods for solving convection-diffusion partial differential equations. When combined with finite element methods for space discretization, the Semi-Lagrangian schemes are also called Lagrange-Galerkin or characteristics-finite element methods. They have been introduced in the eighties by Pironneau and Douglas-Russel. Our approach uses the formalism of continuum mechanics in which classical and new methods can be introduced in a natural way. For convection-diffusion equations, second order Pure Lagrange-Galerkin schemes have been previously introduced by the authors where stability and error estimates for time semi-discretized and full-discretized schemes have been proved. The main goal of this communication is to extend these ideas to solve the motion equation of continuum mechanics. In particular, numerical results for the incompressible Navier-Stokes equations and some hydroelasticity problems are shown. While the numerical analysis appears to be difficult, preliminary numerical results for test examples are promising.

Data	**Mércores 27 de febreiro de 2013**
Lugar	**Aula de videoconferencia do Dpto. de Análise Matemática da Fac. de Matemáticas (Santiago). Salón de Graos da Fac. de Ciencias (Lugo) por videoconferencia.**
Hora	**12:00 – 13:00**

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