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Knight, D. G.

Revisiting Newtonian and non-Newtonian fluid mechanics using computer algebra.

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Summary: This article illustrates how a computer algebra system, such as Maple, can assist in the study of theoretical fluid mechanics, for both Newtonian and non-Newtonian fluids. The continuity equation, the stress equations of motion, the Navier-Stokes equations, and various constitutive equations are treated, using a full, but straightforward, notation. Programs are presented that can produce these equations in various coordinate systems, as is the algebra system used to obtain solutions for specific examples in parallel and rotational flow.

Classification: M55 R25 R35

Keywords: fluid mechanics; mathematical applications; computer algebra; coordinate systems

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