

OPTIMAL CONTROL FOR TWO-DIMENSIONAL STOCHASTIC SECOND GRADE FLUIDS

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ABSTRACT. This article deals with a stochastic control problem for certain fluids of non-Newtonian type. More precisely, the state equation is given by the two-dimensional stochastic second grade fluids perturbed by a multiplicative white noise. The control acts through an external stochastic force and we search for a control that minimizes a cost functional. We show that the Gâteaux derivative of the control to state map is a stochastic process being the unique solution of the stochastic linearized state equation. The well-posedness of the corresponding stochastic backward adjoint equation is also established, allowing to derive the first order optimality condition.

Also we will discuss the uniqueness result.

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