1067-49-1643   **Gisèle Mophou*** (`gmophou@univ-ag.fr`), Université des Antilles et de la Guyane, Laboratoire CEREGMIA, Campus Fouillole, 97159 Pointe-à-Pitre, Guadeloupe (FWI), 97159 Pointe à Pitre, Guadeloupe. *Optimal Control of Fractional Diffusion Equation.*

In this paper we apply the classical control theory to a fractional diffusion equation in a bounded domain. The fractional time derivative is considered in Riemann-Liouville sense. We first study the existence and the uniqueness of the solution of the fractional diffusion equation in a Hilbert space. Then we show that the considered optimal control problem has a unique solution. Interpreting the Euler-Lagrange first order optimality condition with an adjoint problem defined by means of right fractional caputo derivative , we obtain an optimality system for the optimal control. (Received September 21, 2010)