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Contrôlabilité d'une équation à diffusion anormale/Controllability of an anomalous diffusion equation

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Many physical phenomena are characterized by an anomalous diffusion when the mean square displacement of a
particle will grow at a nonlinear rate in time. Some typical examples are the subdiffusional mobility of the proteic macromolecules in overcrowded cellular cytoplasm [3] and the smoke's superdiffusion in turbulent atmosphere [2].

We consider a simple one dimensional linear model which
describes an anomalous diffusive behavior, involving a fractional Laplace operator, and we study its controllability
property. If the fractional power of the Laplace operator is less or equal than $\frac{1}{2}$, the system is not spectrally controllable [1].

The
aim of the paper is twofold. Firstly, to analyze the possibility of controlling a finite number N of eigenmodes of the solution and to find the behavior of the corresponding controls when N tends to infinity. Secondly, to investigate the null-controllability property of the system when the support of the control moves linearly with respect to time.

[1] Sorin Micu and Enrique Zuazua, On the controllability of a fractional order parabolic equation, SIAM J. Control Optim. 44 (2006), 1950-1972.

[2] Michael F.Shlesinger, Joseph Klafter and Bruce J. West, Levy walks with applications to turbulence and chaos, Physica A: Statistical Mechanics and its Applications 140 (1986), 212-218.

[3] Matthias Weiss, Markus Elsner, Fredrik Kartberg and Tommy Nilsson, Anomalous Subdiffusion Is a Measure for Cytoplasmic Crowding in Living Cells, Biophysical Journal 87 (2004), 3518-3524.

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