

Transferring control properties in a non-linear Stieltjes system*

L. Barbanti (barbanti@ime.usp.br)

IME-USP

1. Introduction - In this paper we give conditions for transmit controllability properties from discrete systems to a nonlinear Stieltjes integral equation

$$(S) \quad x(t) + \int^t d\alpha(s) f(s, x(s)) = u(t) \quad t \in [a, b]$$

[with both the state – x – and imput – u – variables, having values in B-spaces and being regulated, and the Niemitskij operator generated by f being well-defined on the regulated functions spaces.]

2. The approximation scheme - In [1] it is done a method that allows us to synthetize a sequence of time discrete systems

$$(S_n) \quad x_n + A(x_n) = u_n$$

[where A is a linear operator and u_n is done by u in (S)] in such a way the solutions x_n in (S_n) (actually step functions) converge uniformly to the solutions x of (S).

This approximation scheme yields – according the method developed in [2] – the possibility of (S) to have control properties inherited from the properties in (S_n) (actually easier of to be checked).

A numerical scheme for this transmission of properties is provided using the interior point method (in fact a barrier algorithm) by V. Zadhan (see e.g. [3]).

Reference

- [1] L. Barbanti - Linear Stieltjes equation and existence of regulated solutions. (Preprint), 1997.
- [2] Fernandez, H. & Herdman, T. - Transferale control properties and semi-groups. (Techn. Report - VPI - n. 25 - 1992).
- [3] Evtushenko, Yu. & Zadhan, V. - Barrier-projection methods, Comp. Math. Math. Phys. 34 (1994) n. 5, 579-590.

This work was supported by FAPESP, and partially done in the Institute of Math. of the Czech Ac. of Sc. at Praha.