

1043-35-79

Jing Zhang* (jz4f@virginia.edu), University of Virginia, Department of Mathematics, Charlottesville, VA 22904. *Min-max game theory problems for coupled systems of PDEs and associated non-standard Riccati equations.*

Min-max control problems defined for a large class of PDE models are considered. A distinct feature of the problems under consideration is the fact that control function (counteracting potential disturbances in minimizing given objective) acts upon the system distributionally (not functionally). This happens typically when the support of control is of measure zero, such as they arise in boundary or point controls. Our goal is to establish well-posedness of a non-standard Riccati equation, whose solution yields a feedback operator driving the optimal solution. The theory presented is focused on non-smoothing dynamics as they arise in hyperbolic-like problems. We shall show that under the assumption of "singular" estimate imposed on the dynamics (A, B) , (A the generator, B the control).

$$|e^{At}B| < \frac{1}{t^\alpha}, \quad 0 < \alpha < 1$$

Riccati equation is wellposed. The solution to the obtained Riccati equation generates a feedback operator which, in turn, synthesis the optimal control.

The "singular estimate" assumption is motivated by a new class of controlled dynamics which arise in hyperbolic-parabolic interacting (coupled system) such as:

- structured acoustic model;
- fluid structure model;
- thermoelastic plate model. (Received August 18, 2008)