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Abstracts of Short Communications and Posters

Section:

17. Control Theory and Optimization

1991 MS Classification: 41,49
Just, Andrzej, Technical University of Lodz, Poland
A Non-linear Hyperbolic Control Problem with Dirichlet Boundary Condition - Convergence of Galerkin Approximation.
The paper is concerned with optimal control problem for the cost functional $J(u) = \lambda_1||y - y_d||^2_{L^2(0,T;L^2(\Omega))} + \lambda_2||y - y_d||^2_{L^2(0,T;L^2(\Omega))} + ||u - u_0||^2_U$ $\lambda_1, \lambda_2 \geq 0$, $\lambda_1 + \lambda_2 > 0$, $u \in U$ – Hilbert space, where $y = y(u)$ is a solution of nonlinear hyperbolic equations $y'' + Ay' + Ly = g + Bu$; $y(0) = y'(0) = 0$ with homogeneous Dirichlet condition in Spbolev spaces, A is nonlinear operator, L and B are linear operators and g, y_d, y'_d, u_0 are the given elements in the respective spaces. We derive some results on the existence of optimal controls. Then we treat optimal control problem by Galerkin method and we prove the convergence of optimal values for approximated control problems to the one for the orginal problem.
Reference: A. Debinska-Nagorska, A. Just, Z. Stempien, Approximation of Some Optimization Problems for System Governed by Nonlinear Parabolic Equation, *Control and Cybernetics*, Vol. **24**, No 1, 1995, 30–40.