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17. Control Theory and Optimization

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A Non-linear Hyperbolic Control Problem with Neumann Boundary Condition – Convergence of Galerkin Approximation

This paper present the optimal control problem involving a system governed by a nonlinear hyperbolic equation $\frac{d^2y}{dt^2} + A(\frac{dy}{dt}) + Ly = g + Bu$, $y(0) = \frac{dy}{dt}(0) = 0$ with homogeneous Neumann boundary condition in Sobolev spaces with control acting on the domain and quadratic cost. We use the Galerkin approximation and we demonstrate existence of the weak and strong condensation points of a set of solutions of the approximate optimization problems. Each of these points is a solution of the initial optimization problem. The obtained results are the generalization of the work of Debinska-Nagorska Anna, Just Andrzej, Stempien Zdzislaw, Analysis and Semidiscrete Galerkin Approximation of a Class of Nonlinear Parabolic Optimal Control Problems, *Computers an Mathematics with Applications* (to appear).