Arguchintsev, A. V.; **Krutikova, O. A.**

Optimization of semilinear hyperbolic systems with smooth boundary controls. (English, Russian) Zbl 1008.49014

Russ. Math. 45, No. 2, 1-9 (2001); translation from Izv. Vyssh. Uchebn. Zaved., Mat. 2001, No. 2, 3-12 (2001).

The authors consider the following optimal control problem for semilinear hyperbolic systems with smooth boundary controls $u(s)$:

$$J(u) = \int_S \varphi(x(s,t_1),s)\,ds + \iint_P F(x,s,t)\,ds\,dt \to \text{minimum},$$

$$\frac{\partial x}{\partial t} + A(s,t)\frac{\partial x}{\partial s} = f(x,s,t),$$

$$x(s,t_0) = p(u(s),s), \quad x^+(s_0,t) = M(t)x^-(s_0,t) + g^{(1)}(t),$$

$$x^-(s_1,t) = N(t)x^+(s_1,t) + g^{(2)}(t).$$

For these problems, a necessary optimality condition is derived and a numerical method is given, which is based on the optimality condition. A numerical test is given.

Reviewer: Hans Benker (Merseburg)

MSC:

49K20 Optimality conditions for problems involving partial differential equations
49M05 Numerical methods based on necessary conditions
35Q93 PDEs in connection with control and optimization
35L40 First-order hyperbolic systems

Keywords:

optimal control; semilinear hyperbolic systems; necessary optimality condition; numerical method