Sattayatham, P.

Strongly nonlinear impulsive evolution equations and optimal control. (English)

Zbl 1065.49023
Nonlinear Anal., Theory Methods Appl., Ser. A, Theory Methods 57, No. 7-8, 1005-1020 (2004).

The system is described by the evolution equation

$$x'(t) + A(t, x(t)) = g(t, x(t)) + B(t)u(t)$$

satisfied in an interval $0 < t < T$ minus a finite set $\{t_k\}$, $0 < t_1 < t_2 < \cdots < t_n < T$. The solution satisfies an initial condition at $t = 0$ and jump conditions at the other points,

$$x(0) = x_0, \quad x(t_k^+) - x(t_k) = F_k(x(t_k)), \quad k = 1, 2, \ldots, n.$$

The author discusses existence of solutions to a control problem that consists of minimizing an integral functional $J(x, u)$ over trajectories of the system.

Reviewer: Hector O. Fattorini (Los Angeles)

MSC:

49N25	Impulsive optimal control problems
49J27	Existence theories for problems in abstract spaces
34G20	Nonlinear differential equations in abstract spaces
93C25	Control/observation systems in abstract spaces
34A37	Ordinary differential equations with impulses
49J15	Existence theories for optimal control problems involving ordinary differential equations

Keywords:

control of impulsive evolution equations; optimal control; Lagrange problems

Full Text: DOI

References:

[1] Ahmed, N.U., Measure solution for impulsive systems in Banach spaces and their control, Dyn. continuous discrete impulsive syst., 6, 519-535, (1999) · Zbl 0951.34040

[2] Ahmed, N.U.; Teo, K.L., Optimal control of distributed parameter systems, (1981), North-Holland New York · Zbl 0472.49001

[3] Balder, E., Necessary and sufficient conditions for \textit{L}1 strong-weak lower semicontinuity of integral functionals, J. nonlinear anal., 11, 1399-1404, (1987) · Zbl 0638.49004

[4] Gilbarg, D.; Trudinger, N.S., Elliptic partial differential equations of second order, (1980), Springer New York · Zbl 0691.35001

[5] S. Hu, N.S. Papageorgiou, Handbook of Multivalued Analysis, Vol. I, Kluwer Academic Publishers, Boston, London, 1997. · Zbl 0887.47001

[6] Liu, J.H., Nonlinear impulsive evolution equations, Dyn. continuous discrete impulsive syst., 6, 77-85, (1999) · Zbl 0932.34067

[7] Rogovchenko, Y.V., Impulsive evolution systems: main result and new trends, Dyn. continuous discrete impulsive syst., 3, 77-88, (1997) · Zbl 0879.34014

[8] Sattayatham, P.; Tangmanee, S.; Wei, Wei, On periodic solution of nonlinear evolution equation, Jmaa, 276, 98-108, (2002) · Zbl 1029.34045

[9] E. Zeidler, Nonlinear Functional Analysis and Its Applications, Vol. II, Springer, New York, 1990. · Zbl 0684.47029