

On the almost automorphy of bounded solutions of differential equations with piecewise constant argument

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Abstract: In this paper we give sufficient spectral conditions for the almost automorphy of bounded solutions to differential equations with piecewise constant argument of the form $x'(t) = A x([t]) + f(t)$, $t \in \mathbb{R}$, where A is a bounded linear operator in X and f is an X -valued almost automorphic function. © 2006 Elsevier Inc. All rights reserved.

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References:

1. Alonso, A.I., Hong, J., Rojo, J., A class of ergodic solutions of differential equation with piecewise continuous delays (1998) *Dynam. Systems Appl.*, 7, pp. 561-574
2. Arendt, W., Batty, C.J.K., Almost periodic solutions of first and second order Cauchy problems (1997) *J. Differential Equations*, 137 (2), pp. 363-383
3. Arendt, W., Batty, C.J.K., Hieber, M., Neubrander, F., *Vector-Valued Laplace Transforms and Cauchy Problems* (2001) *Monogr. Math.*, 96, Birkhäuser, Basel
4. Basit, B., Generalization of two theorems of M.I. Kadets concerning the indefinite integral of abstract almost periodic

- functions (1971) *Mat. Zametki*, 9, pp. 311-321. , (in Russian)
5. Busenberg, S., Cooke, K.L., Models of vertically transmitted diseases with sequential-continuous dynamics (1982) *Nonlinear Phenomena in Mathematical Sciences*, pp. 179-187. , Lakshmikantham V. (Ed), Academic Press, New York
 6. Cabada, A., Ferreira, J.B., Nieto, J.J., Green's function and comparison principles for first order periodic differential equations with piecewise constant arguments (2004) *J. Math. Anal. Appl.*, 291, pp. 690-697
 7. Cooke, K.L., Wiener, J., Retarded differential equations with piecewise constant delays (1984) *J. Math. Anal. Appl.*, 99, pp. 265-297
 8. Cooke, K.L., Wiener, J., Neutral differential equations with piecewise constant argument (1987) *Boll. Unione Mat. Ital.*, 7, pp. 321-349
 9. Cooke, K.L., Wiener, J., A survey of differential equation with piecewise continuous delays (1991) *Lecture Notes in Math.*, 1475, pp. 1-15. , Springer-Verlag, Berlin
 10. Dat, T.T., On the existence of almost periodic, periodic and quasi periodic solutions of neutral differential equations with piecewise constant argument (2005) *Int. J. Evol. Equ.*, 1, pp. 29-44
 11. Diagana, T., N'Guérékata, G.M., Minh, N.V., Almost automorphic solutions of evolution equations (2004) *Proc. Amer. Math. Soc.*, 132, pp. 3289-3298
 12. Eduardo, M.H., A Massera type criterion for a partial neutral functional differential equation (2002) *Electron. J. Differential Equations*, 2002 (40), pp. 1-17
 13. Furumochi, T., Naito, T., Minh, N.V., Boundedness and almost periodicity of solutions of partial functional differential equations (2002) *J. Differential Equations*, 180, pp. 125-152
 14. Hino, Y., Murakami, S., Almost automorphic solutions for abstract functional differential equations (2003) *J. Math. Anal. Appl.*, 286, pp. 741-752
 15. Hino, Y., Naito, T., Minh, N.V., Shin, J.S., (2002) *Almost Periodic Solutions of Differential Equations in Banach Spaces*, , Taylor and Francis, London
 16. Kopper, T., Yuan, R., On quasi-periodic solutions of differential equations with piecewise constant argument (2002) *J. Math. Anal. Appl.*, 267, pp. 173-193
 17. Levitan, B.M., Zhikov, V.V., Almost Periodic Functions and Differential Equations (1978) *Monogr. Math.*, 96. , Moscow Univ. Publ. House English translation by Cambridge University Press, 1982
 18. Liu, J., N'Guérékata, G.M., Minh, N.V., A Massera type theorem for almost automorphic solutions of differential equations (2004) *J. Math. Anal. Appl.*, 299 (2), pp. 587-599
 19. Massera, J.L., The existence of periodic solutions of systems of differential equations (1950) *Duke Math. J.*, 17, pp. 457-475
 20. Minh Man, N., Minh, N.V., On the existence of quasi periodic and almost periodic solutions of neutral functional differential equations (2004) *Commun. Pure Appl. Anal.*, 3, pp. 291-300
 21. Murakami, S., Naito, T., Minh, N.V., Evolution semigroups and sums of commuting operators: A new approach to the admissibility theory of function spaces (2000) *J. Differential Equations*, 164, pp. 240-285
 22. Murakami, S., Naito, T., Minh, N.V., Massera Theorem for almost periodic solutions of functional differential equations (2004) *J. Math. Soc. Japan*, 56 (1), pp. 247-268
 23. Naito, T., Minh, N.V., Shin, J.S., New spectral criteria for almost periodic solutions of evolution equations (2001) *Studia Math.*, 145, pp. 97-111
 24. Naito, T., Minh, N.V., Miyazaki, R., Hamaya, Y., Boundedness and almost periodicity in dynamical systems (2001) *J. Difference Equ. Appl.*, 7, pp. 507-527
 25. Naito, T., Miyazaki, R., Minh, N.V., Shin, J.S., A decomposition theorem for bounded solutions and the existence of periodic

- solutions to periodic equations (2000) *J. Differential Equations*, 160 (1), pp. 263-282
26. N'Guérékata, G.M., Almost automorphic functions and applications to abstract evolution equations (1999) *Contemp. Math.*, 252, pp. 71-76
 27. N'Guérékata, G.M., (2001) *Almost Automorphic and Almost Periodic Functions in Abstract Spaces*, Kluwer, Amsterdam
 28. N'Guérékata, G.M., (2005) *Topics in Almost Automorphy*, Springer, New York
 29. Papaschinopoulos, G., Some results concerning a class of differential equations with piecewise constant argument (1994) *Math. Nachr.*, 166, pp. 193-206
 30. Papaschinopoulos, G., Exponential dichotomy, topological equivalence and structural stability for differential equations with piecewise constant argument (1994) *Analysis*, 14, pp. 239-247
 31. Papaschinopoulos, G., On the integral manifold for a system of differential equations with piecewise constant argument (1996) *J. Math. Anal. Appl.*, 201, pp. 75-90
 32. Papaschinopoulos, G., Linearization near the integral manifold for a system of differential equations with piecewise constant argument (1997) *J. Math. Anal. Appl.*, 215, pp. 317-333
 33. Prüss, J., (1993) *Evolutionary Integral Equations and Applications*, Birkhäuser, Basel
 34. Seifert, G., Almost periodic solutions of certain differential equations with piecewise constant delays and almost periodic time dependence (2000) *J. Differential Equation*, 164, pp. 451-458
 35. Seifert, G., Second order neutral delay differential equations with piecewise constant time dependence (2003) *J. Math. Anal. Appl.*, 281, pp. 1-9
 36. Shah, S.M., Wiener, J., Advanced differential equations with piecewise constant argument deviations (1983) *Int. J. Math. Math. Sci.*, 6, pp. 671-703
 37. Thanh, N.T., Massera criterion for periodic solutions of differential equations with piecewise constant argument (2005) *J. Math. Anal. Appl.*, 302, pp. 256-268
 38. Wiener, J., (1993) *Generalized Solutions of Functional Differential Equations*, World Scientific, Singapore
 39. Wiener, J., Cooke, K.L., Oscillations in systems of differential equations with piecewise constant argument (1989) *J. Math. Anal. Appl.*, 137, pp. 221-239
 40. Wiener, J., Heller, W., Oscillatory and periodic solutions to a diffusion equation of neutral type (1999) *Int. J. Math. Math. Sci.*, 22 (2), pp. 313-348
 41. Yuan, R., Hong, J., Almost periodic solutions of differential equations with piecewise constant argument (1996) *Analysis*, 16, pp. 171-180
 42. Yuan, R., Hong, J., The existence of almost periodic solution for a class of differential equations with piecewise constant argument (1997) *Nonlinear Anal.*, 28, pp. 1439-1450
 43. Yuan, R., Almost periodic solutions of a class of singularly perturbed differential equations with piecewise constant argument (1999) *Nonlinear Anal.*, 37, pp. 641-659
 44. Yuan, R., On the logistic delay differential equations with piecewise constant argument and quasi periodic time dependence (2002) *J. Math. Anal. Appl.*, 274, pp. 124-133
 45. Zhang, F., Zhao, A., Yan, J., Monotone iterative method for differential equations with piecewise constant arguments (2000) *Port. Math.*, 57 (Fasc. 3)