Ezzinbi, Khalil; **Liu, James H.**; **Nguyen Van Minh**
Periodic solutions of impulsive evolution equations. (English) Zbl 1198.34106
Int. J. Evol. Equ. 4, No. 1, 103-111 (2009).

Let X be a Banach space. The following semilinear equation with impulses

$$u'(t) + A(t)u(t) = f(t, u(t)),\ t \in (0, \infty),\ t \neq t_i,\ u(0) = u_0,$$

$$\Delta u(t_i) = I_i(u(t_i)),\ i = 1, 2, \ldots,\ 0 < t_1 < t_2 < \cdots < \infty,$$

is studied, where $A(t)$ and $f(t, u)$ are T-periodic in t, I_i, $i = 1, 2, \ldots$, are Lipschitzian, $f(t, u)$ is continuous in (t, u) and Lipschitzian in u. The existence of periodic mild solutions to the above problem is considered. The main result states that if the above equation has an ultimate bounded mild solution, then it has a T-periodic mild solution. The authors establish this result by means of some compactness assumptions on the semigroup generated by $A(t)$ and of Horn's fixed point theorem.

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MSC:

34G20	Nonlinear differential equations in abstract spaces
34C25	Periodic solutions to ordinary differential equations
34A37	Ordinary differential equations with impulses
47N20	Applications of operator theory to differential and integral equations
34C11	Growth and boundedness of solutions to ordinary differential equations

Keywords:

impulsive evolution equations; periodic solutions