■ **Q-HEUNG CHOI** Department of Mathematics Education, Inha University, Incheon 402-751, Korea, email: qheung@inha.ac.kr, **TACKSUN JUNG** Department of Mathematics, Kunsan National University, Kunsan 573-701, Korea, email: tsjung@kunsan.ac.kr

BOUNDED WEAK SOLUTION FOR THE HAMILTONIAN SYSTEM

Abstract

In this paper we investigate the bounded 2π-periodic weak solutions for the Hamiltonian system

$$-J\dot{z} = G_z(t, z(t)),$$

where $\dot{z} = \frac{dz}{dt}$, G_z is the gradient of G and J be the standard symplectic structure on R^{2n}, i. e., $J = \begin{pmatrix} 0 & -I_n \\ I_n & 0 \end{pmatrix}$, I_n is the $n \times n$ identity matrix. We assume that $G \in C^2(R^1 \times R^{2n}, R^1)$ satisfies the following conditions:

$(G1)$ $G \in C^2(R^1 \times R^{2n}, R^1)$,

$(G2)$ $G(t, z(t)) = O(|z|^2)$ as $|z| \to 0$, $G(t, \theta) = 0$, $G_z(t, \theta) = \theta$, where $\theta = (0, \cdots, 0)$,

$(G3)$ there exists $C > 0$ such that $|G(t, \xi)| < C$ $\forall t \in R$, $\xi \in R$.

1.1 Assume that G satisfies the conditions $(G1) - (G3)$. Then system (1.1) has at least one bounded 2π-periodic solution.

Bibliography

[1] Chang, K. C., *Infinite dimensional Morse theory and multiple solution problems*, Birkhäuser, (1993).

[2] Benci, V. and Rabinowitz, P.H., *Critical point theorems for indefinite functionals*, Inventions Math. vol. 52, 241-273(1979).

[3] Jung, T. and Choi, Q.H., *On the number of the periodic solutions of the nonlinear Hamiltonian system*, Nonlinear Analysis TMA. vol. 71, No. 12 e1100-e1108 (2009).

[4] Jung, T. and Choi, Q.H., *Periodic solutions for the nonlinear Hamiltonian systems*, Korean Journal of Mathematics vol 17, No. 3 331-340 (2009).