

# Stepanov-like pseudo anti-periodicity and applications to semi-linear parabolic boundary differential equations

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## Abstract

This paper is mainly devoted to the existence of pseudo anti-periodic solutions of parabolic boundary differential equations by the measure theory. A new class of functions called Stepanov-like  $(\mu, \nu)$ -pseudo anti-periodic functions is proposed, which generalizes the classical weighted pseudo anti-periodic functions in Stepanov sense. The completeness of the space composed of these functions is proved. Translation invariance and two composition theorems are also established. As an application different from parabolic equations with linear boundary conditions, one shows that semi-linear parabolic evolution equations with inhomogeneous boundary conditions admit a  $(\mu, \nu)$ -pseudo anti-periodic solution in interpolation and extrapolation spaces. An example is presented to verify the existence of pseudo anti-periodic solution.

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