

Diblík, Josef; Galewski, Marek; Koniorczyk, Marcin; Schmeidel, Ewa
An application of a diffeomorphism theorem to Volterra integral operator. (English)

Zbl 1463.45056

Differ. Integral Equ. 31, No. 7-8, 621-642 (2018).

This paper studies Volterra operators

$$V(x)(t) = x(t) + \int_0^t v(t, \tau, x(\tau)) d\tau,$$

on the space $\tilde{W}_0^{1,p}([0, 1], \mathbb{R}^n)$ of absolutely continuous functions x with $x' \in L^p$ and $x(0) = 0$. Under appropriate assumptions on the function v , it is proved, using a global diffeomorphism theorem, that the operator V is a diffeomorphism. This provides existence and uniqueness of the solution of the equation $V(x) = y$, as well as its smooth dependence on y .

Reviewer: [Guy Katriel \(Haifa\)](#)

MSC:

[45P05](#) Integral operators

[45D05](#) Volterra integral equations

[26B10](#) Implicit function theorems, Jacobians, transformations with several variables

[47J07](#) Abstract inverse mapping and implicit function theorems involving non-linear operators

Cited in 1 Document

Keywords:

[Volterra equation](#); [global diffeomorphism theorem](#)