

O'Regan, D.

A note on the application of topological transversality to nonlinear differential equations in Hilbert spaces. (English) [Zbl 0684.34063](#)
[Rocky Mt. J. Math.](#) 18, No. 4, 801-811 (1988).

The existence of a solution of the initial value problem

$$(1) \quad y' = f(t, y), \quad t \in [0, T], \quad y(0) = 0,$$

where y takes values in a real Hilbert space H and $f : [0, T] \rightarrow H$ is continuous, is studied. A brief and interesting proof of the existence of a solution of (1) is given using the definition of essential map and the topological transversality theorem. Under the assumption $\|f(t, y)\| \leq \psi(\|y\|)$ with $\psi : [0, +\infty) \rightarrow (0, +\infty)$ and other regularity properties of f the existence of at least one solution in $C^1([0, T], H)$ is proved. Moreover under the assumptions that ensure the existence of the solution of (1), the solution y exists in $C^1([0, T], H)$ where T is given in terms of ψ , i.e. $T < \int_0^{+\infty} du/\psi(u)$.

Reviewer: [S.Totaro](#)

MSC:

[34G20](#) Nonlinear differential equations in abstract spaces

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