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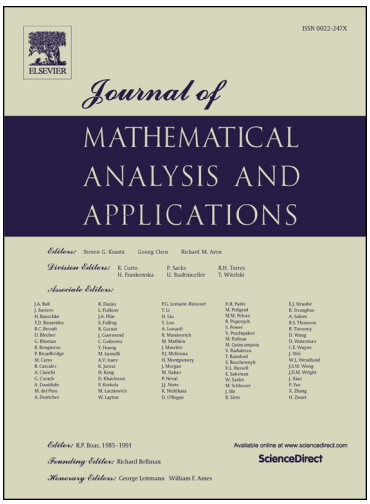


Existence of solutions for a mixed type differential equation with state-dependence

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# Existence of solutions for a mixed type differential equation with state-dependence *

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**Abstract**

In this paper we study a general $n$-dimensional mixed type differential equation with state dependence. Many known works give the existence of solutions with the so-called Return Condition. In this paper, without requiring the Return Condition, we prove a non-local existence of solutions by using a technique of compactification and the dependence of the maximum of functions on the size of their domains. We apply our result to differential equations with iterates.

**Keywords:** functional differential equation; state dependence; existence; return condition.

**AMS 2010 Subject Classification:** 34K05; 34A12; 39B12

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