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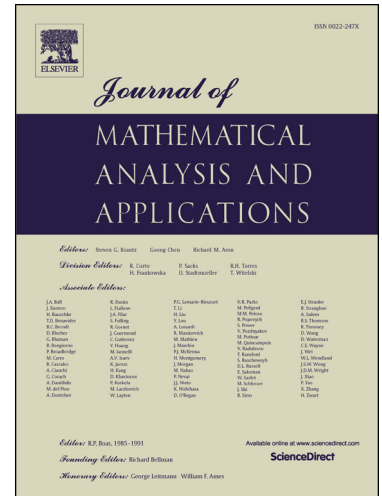
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# The stability and exponential stabilization of the heat equation with memory<sup>☆</sup>

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## Abstract

In this paper, we investigate the stability of heat equation with a constant memory kernel. We prove that the system does not decay for the positive kernel, and is polynomially stable but not exponentially for the negative kernel. In particular, a more detailed description of the decay property for the negative kernel is obtained by dividing initial values into two categories. Moreover, we show that the system can be exponentially stabilized by boundary control for any constant memory kernel.

*Keywords:* stability, stabilization, heat equation, memory

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## 1. Introduction and main results

It is well known that the PDEs have been used to describe problems in various fields. However, in some fields, such as heat transfer and nuclear reactor dynamics, people often need to consider the effect of the past on the present. Hence, a partial integrodifferential equation is needed to represent the problem.

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