

## Expansive Automorphisms of Locally Compact Solvable Groups

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### Introduction

Let  $G$  be a locally compact group and  $\sigma$  be a bicontinuous automorphism of  $G$ . We call the automorphism  $\sigma$  *expansive* if there exists an open neighborhood  $U$  of the identity  $e$  in  $G$  such that  $x \in U$  and  $x \neq e$  imply  $\sigma^n(x) \notin U$  for some integer  $n$ . Obviously,  $\sigma$  is expansive if and only if  $\bigcap_{i=-\infty}^{\infty} \sigma^i(U) = \{e\}$  holds.

The structures of expansive automorphisms and of compact groups admitting them have been investigated by several authors, including Eisenberg [4, 5], Wu [12], Lam [8], Lawton [9] and Dateyama and the present author [2]. However the structure of locally compact groups which admit expansive automorphisms are yet unknown, except in special cases. For example, if a locally compact almost maximal group admits an expansive automorphism, then it is abelian [8]. But there exists a locally compact connected nilpotent group which admits an expansive automorphism [1].

It will be interesting to investigate what kind of locally compact connected groups admit expansive automorphisms. Our aim is to discuss this problem. However the nilpotent case has been already examined in [1].

Throughout this paper, all subgroups of the group  $G$  are closed subgroups and all automorphisms are onto and bicontinuous. The restriction and the factor of an automorphism will be denoted by the same symbols if there is no risk of confusion.

### §1. Main results.

We shall show the following Theorems 1 and 2 which are main results of this paper.