

Zeitschrift: L'Enseignement Mathématique
Herausgeber: Commission Internationale de l'Enseignement Mathématique
Band: 34 (1988)
Heft: 1-2: L'ENSEIGNEMENT MATHÉMATIQUE

Artikel: AN ELEMENTARY PROOF OF THE STRUCTURE THEOREM FOR CONNECTED SOLVABLE AFFINE ALGEBRAIC GROUPS
Autor: Dokovi, Dragomir Ž.
Kurzfassung: Abstract
DOI: <https://doi.org/10.5169/seals-56599>

Nutzungsbedingungen

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften auf E-Periodica. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. Das Veröffentlichen von Bildern in Print- und Online-Publikationen sowie auf Social Media-Kanälen oder Webseiten ist nur mit vorheriger Genehmigung der Rechteinhaber erlaubt. [Mehr erfahren](#)

Conditions d'utilisation

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. La reproduction d'images dans des publications imprimées ou en ligne ainsi que sur des canaux de médias sociaux ou des sites web n'est autorisée qu'avec l'accord préalable des détenteurs des droits. [En savoir plus](#)

Terms of use

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. Publishing images in print and online publications, as well as on social media channels or websites, is only permitted with the prior consent of the rights holders. [Find out more](#)

Download PDF: 05.04.2026

ETH-Bibliothek Zürich, E-Periodica, <https://www.e-periodica.ch>

AN ELEMENTARY PROOF OF THE STRUCTURE THEOREM FOR CONNECTED SOLVABLE AFFINE ALGEBRAIC GROUPS

by Dragomir Ž. ĐOKOVIĆ ¹⁾

ABSTRACT

We give an elementary proof of the basic structure theorem for connected solvable affine algebraic groups G over an algebraically closed field k . The main feature of our proof is that we first establish the important fact that the centralizer in G of a semisimple element s is connected. Then the main structure theorem follows easily. We also prove that such s is contained in a maximal torus and that all maximal tori of G are conjugate. The structure theorem for connected nilpotent affine groups is not needed in the proof; it is obtained at the end as a simple consequence of the main results. In our proof we avoid the use of quotients and Lie algebras of affine groups. On the other hand we use the Lie-Kolchin theorem, Chevalley's theorem, the existence and uniqueness of the Jordan decomposition, and some other elementary facts.

Let k be an algebraically closed field. All algebraic groups will be defined over k and are assumed to be affine. By $N \rtimes H$ we denote the semidirect product of affine algebraic groups where N is a normal and H a complementary subgroup. If G is any affine algebraic group we shall denote by G_u (resp. G_s) the set of all unipotent (resp. semisimple) elements of G . By G^0 we denote the identity component of G and by G' the derived subgroup of G . A torus S in G will be called maximal if $S \subset T$ implies that $T = S$ for any torus T of G . The center of G is denoted by $Z(G)$. The centralizer of $s \in G$ resp. $S \subset G$ in a subgroup $H \subset G$ will be denoted by $Z_H(s)$ resp. $Z_H(S)$. The existence and uniqueness of the Jordan decomposition for elements of G will be used without explicit reference. All group homomorphisms will be homomorphisms of affine algebraic groups. For other proofs of the structure theorem for connected solvable affine algebraic groups we refer the reader to the references [1-5].

¹⁾ This work was supported by the NSERC of Canada Grant A-5285.
1980 *Mathematics Subject Classification*: primary 20G15, secondary 22E25.