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$\mathbf{SL_N(F[X])}$ IS NOT BOUNDEDLY GENERATED BY ELEMENTARY MATRICES: EXPLICIT PROOF*

IGOR V. EROVENKO†

Abstract. Using methods of higher algebraic K-theory, van der Kallen proved that $SL_n(F[x])$ does not have bounded word length with respect to elementary matrices if the field F has infinite transcendence degree over its prime subfield. A short explicit proof of this result is exhibited by constructing a sequence of matrices with infinitely growing word length. This construction is also used to show that $SL_n(\mathbb{Z}[x])$ does not have bounded word length with respect to elementary matrices of "bounded degree".

Key words. Word length, Elementary matrix, Polynomial matrix.

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†Department of Mathematical Sciences, University of North Carolina at Greensboro, Greensboro, NC 27402, USA (igor@uncg.edu).