Electronic Journal of Linear Algebra ISSN 1081-3810
A publication of the International Linear Algebra Society
Volume 13, pp. 146-152, June 2005

ELA
www.math.technion.ac.il/iic/ela

AN INVARIANT OF 2×2 MATRICES*

JOSÉ LUIS CISNEROS-MOLINA†

Abstract. Let W be the space of 2×2 matrices over a field K. Let f be any linear function on W that kills scalar matrices. Let $A \in W$ and define $f_k(A) = f(A^k)$. Then the quantity $f_{k+1}(A)/f(A)$ is invariant under conjugation and moreover $f_{k+1}(A)/f(A) = \operatorname{trace} S^k A$, where $S^k A$ is the k-th symmetric power of A, that is, the matrix giving the action of A on homogeneous polynomials of degree k.

Key words. Matrix invariants, Power of a matrix, Trace, Symmetric Power of a Matrix.

AMS subject classifications. 15A72, 15A69.

*Received by the editors 23 August 2003. Accepted for publication 31 May 2005. Handling Editor: Robert Guralnick.

†Instituto de Matemáticas, UNAM, Unidad Cuernavaca, A.P. 6-60, C.P. 62131, Cuernavaca, Morelos, Mexico (jlcm@matcuer.unam.mx).