

THE LINEAR INDEPENDENCE OF SETS OF TWO AND THREE CANONICAL ALGEBRAIC CURVATURE TENSORS*

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Abstract. We generalize the construction of canonical algebraic curvature tensors by self-adjoint endomorphisms of a vector space to arbitrary endomorphisms. Provided certain basic rank requirements are met, we establish a converse of the classical fact that if A is symmetric, then R_A is an algebraic curvature tensor. This allows us to establish a simultaneous diagonalization result in the event that three algebraic curvature tensors are linearly dependent. We use these results to establish necessary and sufficient conditions that a set of two or three algebraic curvature tensors be linearly independent. We present the proofs of these results using elementary methods.

Key words. Algebraic curvature tensor, Linear independence, Simultaneous diagonalization.

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