

PRODUCTS OF LAURENT OPERATORS AND FIELDS OF VALUES

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ABSTRACT. One of the most fundamental properties of the field of values of an operator is the inclusion of the spectrum within its closure. Obtaining information on the spectrum of products of operators in terms of this spectral inclusion region is a demanding issue. Stating general results seems difficult; however, conclusions can be derived in some special instances. In this paper, we show that the field of values of products of Laurent operators is easily related to the product of their fields of values, and the same occurs for certain classes of Laurent operators with matrix symbols. The results also apply to the class of infinite upper (lower) triangular Toeplitz matrices.

1. INTRODUCTION

Let A be a bounded operator on a Hilbert space H equipped with an inner product $\langle \cdot, \cdot \rangle$. Denote by $B(H)$ the algebra of bounded linear operators over H . In our discussion, we identify H with \mathbb{C}^n whenever H has dimension n . The *field of values* of A is the set of the complex plane defined as

$$W(A) = \{ \langle Af, f \rangle / \langle f, f \rangle : f \in H, \langle f, f \rangle \neq 0 \}.$$

This concept is a useful tool in studying linear operators, and it has been extensively investigated (see, e.g., [4] and the references therein).

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