

ZERO-DILATION INDICES OF KMS MATRICES

HWA-LONG GAU¹ AND PEI YUAN WU^{2*}

Dedicated to Professor Tsuyoshi Ando with admiration

Communicated by Q.-W. Wang

ABSTRACT. The zero-dilation index $d(A)$ of an n -by- n complex matrix A is the maximum size of the zero matrix which can be dilated to A . In this paper, we determine the value of this index for the KMS matrix

$$J_n(a) = \begin{bmatrix} 0 & a & a^2 & \cdots & a^{n-1} \\ & 0 & a & \ddots & \vdots \\ & & \ddots & \ddots & a^2 \\ & & & \ddots & a \\ 0 & & & & 0 \end{bmatrix}, \quad a \in \mathbb{C} \text{ and } n \geq 1,$$

by using the Li-Sze characterization of higher-rank numerical ranges of a finite matrix.

¹ DEPARTMENT OF MATHEMATICS, NATIONAL CENTRAL UNIVERSITY, CHUNGLI 32001, TAIWAN.

E-mail address: hlgau@math.ncu.edu.tw

² DEPARTMENT OF APPLIED MATHEMATICS, NATIONAL CHIAO TUNG UNIVERSITY, HSINCHU 30010, TAIWAN.

E-mail address: pywu@math.nctu.edu.tw

Date: Received: 2 April 2013; Accepted: 3 June 2013.

* Corresponding author.

2010 *Mathematics Subject Classification.* Primary 47A20; Secondary 15B05, 15A60.

Key words and phrases. Zero-dilation index, KMS matrix, higher-rank numerical range, S_n -matrix, S_n^{-1} -matrix.