

# On polynomial numerical hulls of matrices

Abbas Salemi, University of Kerman, Iran

Let  $M_n$  be the set of  $n \times n$  complex matrices. For any  $A \in M_n$ , we use the joint numerical range  $W(A, A^2, \dots, A^l)$  to study the *polynomial numerical hull of order  $l$*  of  $A$ , denoted by  $V^l(A)$ . By considering the  $k$ -rank joint numerical hulls  $\Lambda_k(A, A^2, \dots, A^l)$ , we introduce the  *$k$ -rank polynomial numerical hull of order  $l$*  of a matrix  $A$ , which is defined and denoted by

$$V_k^l(A) = \{\lambda \in \Lambda_k(A) : (\lambda, \lambda^2, \dots, \lambda^l) \in \text{conv}[\Lambda_k(A, A^2, \dots, A^l)]\}.$$

We study some relationship between these two notations.

Key words: higher rank numerical range, joint numerical range, polynomial numerical hull.

AMS Subject Classification: 15A60, 15A18.