1 Dilation of numerical ranges of normal matrices

By *Maria Adam and John Maroulas*.

Let A be an $n \times n$ normal matrix, whose the numerical range $NR[A]$ is a $k-$polygon, and let $v \in \mathbb{C}^n$, be a unit vector. If for a unit vector $v \in \mathbb{C}^n$, the point v^*Av is interior point of $NR[A]$ and P is an $n \times (k-1)$ matrix, such that $P^*P = I_{k-1}$ and $v \perp ImP$, then $NR[A]$ is circumscribed to $NR[C]$, where $C = P^*AP$. In this paper, we investigate the converse way, showing how we obtain $NR[A]$, from a $(k-1)-$polygon, such that the boundary of $NR[C]$ shares the same tangential points with the sides of both polygons.