Operators and Matrices
Volume 10, Number 3 (2016), 625–630
doi:10.7153/oam-10-36

THE CORRELATION NUMERICAL RANGE AND TRACE–POSITIVE COMPLEX POLYNOMIALS

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Abstract. Let $A \in M_n(\mathbb{C})$. We prove that if $W_c(A)$, the correlation numerical range introduced in [2], is a subset of $[0,\infty)$, then $A = P + D$ where P is positive semidefinite and D is a diagonal matrix such that $Tr(D) = 0$. This answers a question of D. Hadwin and D. Han. Additionally, we explore a few properties of $W_c(A)$ and $W_{uc}(A)$, another numerical range introduced in [2] that is closely related to Connes's Embedding Conjecture.

Mathematics subject classification (2010): 47A12, 46L10.
Keywords and phrases: von Neumann algebras; generalized numerical ranges.

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Paper OaM-10-36