On joint essential maximal numerical ranges

Priscah Mogotu Omoke

Department of Pure and Applied mathematics,

Jaramogi Oginga Odinga University of Science and Technology,

Box 210-40601, Bondo-Kenya.

Email: omokepriscah@yahoo.com

Abstract

The study of numerical range of an operator has been an area of intense research. The motivation for the development arose from the classical theory of quadratic forms. It forms a very important aspect in functional analysis, operator theory and its applications to economics, quantum chemistry and quantum computing amongst other fields. A lot of results have been obtained on numerical ranges particularly by Fong, Khan among others. The concept of maximal numerical ranges of a bounded operator $T \in B(H)$ was studied by Stampfli who used it to derive an identity for the norm of derivation. This concept was later generalized by Ghan to the joint maximal numerical ranges of m- tuples of operator. The joint essential maximal numerical range was studied by Khan and established that the joint essential maximal numerical range can be empty. In this paper we have showed that the joint essential maximal numerical range is nonempty, compact and convex. We also established that each element in the joint essential maximal numerical range is a star centre of the joint maximal numerical range. The result obtained show that star-shapedness is related to convexity in that a convex set is starshaped with all its points being star centres.

Keywords: Numerical range, joint maximal numerical range, joint essential maximal numerical range, convexity and convergence.