Tyler J Gonzales*, Department of Mathematics, Hibbard Humanities Hall 508, 124 Garfield Avenue, Eau Claire, WI 54701. Extensions of $M$-matrix Theory to Rectangular $M$-matrices.

We study (square) $M$-matrices and generalizations of such matrices. $M$-matrices are important in many mathematical applications including biology, economics, and probability theory. $M$-matrices have been very extensively studied and there are more than fifty characterizations for a matrix to be an $M$-matrix. There are a number of generalizations of this notion including a study on what are called rectangular $M$-matrices. The objective of this project is to revisit the notion of rectangular $M$-matrices, by giving a better definition to it, as well as to study the extent to which some of the properties of square $M$-matrices could be generalized to this modified concept of rectangular $M$-matrices. (Received September 11, 2019)