Class: M-Matrices

Status: Done

Definitions
• The matrix $A$ is an M-matrix if and only if every off-diagonal entry of $A$ is nonpositive and $A$ is positive stable if and only if every off-diagonal entry of $A$ is nonpositive and every principal minor of $A$ is positive [HJ].
• The partial matrix $B$ is a partial M-matrix if and only if every fully specified principal submatrix of $B$ is an M-matrix and every specified off-diagonal entry of $B$ is nonpositive.

Results:
• A partial M-matrix that includes all diagonal entries can be completed to an M-matrix if and only if the zero completion (obtained by setting all unspecified off-diagonal entries to 0) is an M-matrix [JS1].
• A pattern $Q$ (not necessarily positionally symmetric) has M-completion if and only if the principal subpattern determined by the diagonal positions of $Q$ has M-completion. A pattern that includes all diagonal positions has M-completion if and only if every strongly connected induced subdigraph of its pattern-digraph is a clique [H2].

Examples: Have M-completion
Examples: Do not have M-completion

References: