1003-08-152 **Gregory Battle***, Morehouse College, PO Box 148, 830 Westview Drive, SW, Atlanta, GA 30314. *Structure Theorems For Matrix Rings Over Moore-Penrose Two (MP2) Rings.*
The mathematicians Edwin Moore and Roger Penrose authored the Moore-Penrose Conditions which assert that given any nonzero matrix A over the complex field, there exists a nonzero matrix X such that (1) AXA = A; (2) XAX = X; (3) (XA)* = XA; (4) (AX)* = AX. This paper generalizes the second Moore-Penrose Condition to an arbitrary ring R which will be called MP2 as follows: Given any nonzero element a in R, there exists a nonzero x in R such that xax = x. Accordingly, the structure theorems for such MP2 rings are developed, as well as the structure theorems for matrix rings over them. Interestingly enough, MP2 rings appear frequently in physical chemistry for converting linear operators to symmetric ones, and in engineering applications for solving unstable linear systems, or in business demand-supply matrix models with ill-conditioned Leontif matrices. (Received August 13, 2004)