



**A REFORMULATION OF MATRICES ENGENDERED BY
NULLARY TRANSFORMATIONS**

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Abstract

Matrices are representations of linear transformations and if there are linear transformations without matrix representations, then our concept of a matrix is obviously flawed. Since nullary transformations do not have matrix representations, Bourbaki's definition of a matrix, elegant though it may be, is therefore inadequate. An alternative definition of a matrix as a column vector of row vectors, or as a row vector of column vectors is consequently needed. Along the way, it would also be necessary to make a clear distinction between a row vector and column vector and to define precisely what is the transpose. Nullary matrices are constructed and shown to be the matrix representations of nullary linear transformations. A tabular representation of these matrices is also given and rules are specified which allows one to readily compute matrix expressions involving nullary matrices. The basic properties of nullary matrices are then indicated and their connections to systems of linear equations are noted.

Keywords and phrases: nullary transformations, empty matrices, nullary vectors, representations.

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