



Permutation Matrices

1 Why

Permutations of the set $\{1, 2, \dots, n\}$ correspond to matrices over \mathbf{N} .

2 Definition

The *matrix* corresponding to a permutation of $\{1, 2, \dots, n\}$ is a matrix of natural numbers whose i, j th element is 1 if the permutation maps i to j ; for $i, j \in \{1, 2, \dots, n\}$.

3 Notation

Let $\sigma : \{1, 2, \dots, n\} \rightarrow \{1, 2, \dots, n\}$ be a permutation. Let $M \in \mathbf{N}^{n \times n}$ be such that M_{ij} is one if $\sigma(i) = j$ and 0 otherwise. Then M is the permutation matrix of σ .