

## PERMUTATION MATRICES

## Why

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

## **Definition**

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

## Notation

Let  $\sigma: \{1, 2, ..., n\} \to \{1, 2, ..., n\}$  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  $\sigma$ .

