

# Symmetric group and determinants

This document will bring together two subjects.

## 1 Symmetric group

We studied this in group theory, where we talked about the sign of a permutation, etc. By representing elements of  $S_n$  as matrices, we can apply linear algebra to it and prove things more easily.

## 2 Determinant

When we physically motivated the determinant, there was an interesting axiom that had seemingly no physical basis: interchange of rows flips the sign of  $\det A$ . Of course in that case the volume is given by  $|\det A|$