Definition (**Special** orthogonal group $\mathrm{SO}(n)$)
The special orthogonal group of order n, written $\mathrm{SO}(n)$, is the group of $n \times n$ square matrices that satisfy

$$\mathbf{M}\mathbf{M}^\intercal = \mathbf{M}^\intercal\mathbf{M} = \mathbb{1}$$

and $\det(\mathbf{M}) = 1$.