0.1 Lie algebra of $SU(n)$

0.1.1 $SU(n)$ forms a Lie group

0.1.2 Lie algebra of $SU(n)$

The Lie algebra of (n) is defined as:

$\mathfrak{su}(n) = \{X \in \mathbb{C}^{n\times n} | e^{tX} \in SU(n) \forall t \in \mathbb{R}\}$

This is satisfied by the skew-Hermitian matrices where $M = -M^*$ and the trace is 0. Note that this means the diagonals are all 0 or pure imaginary.