

# Cayley Map and Higher Dimensional Representations of Rotations

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## ABSTRACT

The embeddings of the  $\mathfrak{so}(3)$  Lie algebra and the Lie group  $SO(3)$  in higher dimensions is an important construction from both mathematical and physical viewpoint. Here we will present a program package for building the generating matrices of the irreducible embedding of the Lie algebra  $\mathfrak{so}(3)$  within  $\mathfrak{so}(n)$  for arbitrary dimension  $n \geq 3$  relying on the algorithm developed recently by Campoamor-Strursberg [1]. Besides we investigate the characteristic polynomials of these  $\mathfrak{so}(n)$  elements. We will show also that the Cayley map applied to  $\mathcal{C} \in \mathfrak{so}(n)$  is well defined and generates a subgroup. Furthermore, we obtain explicit formulas for the images of the Cayley map.

## References

- [1] Campoamor-Strursberg R., *An Elementary Derivation of the Matrix Elements of Real Irreducible Representations of  $\mathfrak{so}(3)$* , *Symmetry* **7** (2015) 1655-1669.