## Lie Algebra

## James Cook

- 1. Introduction to Lie Groups with Focus on Matrix Groups A
- 2. Introduction to Lie Groups with Focus on Matrix Groups B
- 3. Introduction to Lie Groups with Focus on Matrix Groups C
- 4. Definition, Examples, Lie Subalgebra, Ideals, Adjoint Homomorphism
- 5. Adjoint Homomorphism, Structure Constants, Cross Product Lie Algebra
- 6. Ideals, Low Dimensional Lie Algebras, Derived Algebra, Solvable, Radical A
- 7. Ideals, Low Dimensional Lie Algebras, Derived Algebra, Solvable, Radical B
- 8. Ideals, Low Dimensional Lie Algebras, Derived Algebra, Solvable, Radical C
- 9. Solvable, Nilpotent and Simple Lie Algebras A
- 10. Solvable, Nilpotent and Simple Lie Algebras B
- 11. Lemmas, Engel and Lie's Theorems, Lie Algebra Homomorphism, Modules A
- 12. Lemmas, Engel and Lie's Theorems, Lie Algebra Homomorphism, Modules B
- 13. Representations, Factor Modules, Irreducible Submodules A
- 14. Representations, Factor Modules, Irreducible Submodules B
- 15. Schur's Lemma, SL(2,C) Representation on Vd Begins
- 16. SL(2,C) Representation on Vd Continued, Irreducibility Confirmed

September 4, 2025