

30. Show that any irreducible complex representation of  $SO(3)$  also defines an irreducible complex representation of  $SU(2)$ .
31. Let  $V$  be the vector space of complex  $2 \times 2$  matrices, and let  $g \in SU(2)$  act on  $A \in V$  as

$$A \rightarrow gAg^\dagger.$$

- a) Show that this defines a representation  $r$  of  $SU(2)$ .
- b) Show that  $r$  is reducible.  
[hint: think about what happens to  $\text{tr}A$ .]
- c) Decompose  $r$  into irreducible representations.

Have a nice holiday break!