

## HOMEWORK 9

- 0.1. Decompose the internal tensor product  $\mathcal{H}_m \otimes \mathcal{H}_k$  as a direct sum of irreducible components.
- 0.2. Compute  $E_{\pm}(X^k Y^{n-k})$  in  $\mathcal{H}_n$ .
- 0.3. Prove that the irreducible representation of  $SU(2)$  of highest weight  $m = 1$  is equivalent to the adjoint representation of  $SU(2)$  on  $sl(2, \mathbb{C})$ .
- 0.4. Compute  $R_*(E_+)$  on  $C^\infty(\mathbb{S}^3)$  (i.e. justify the formulas of 5.3.2 in the notes).