

**Problem 25**

Using the orthogonality relations of matrix elements of irreps, show that

$$\int_G \chi_\mu(g) \chi_\nu(g^{-1}h) dg = \frac{\delta_{\mu\nu}}{n_\mu} \chi_\nu(h)$$

**Problem 26** <sup>1</sup>

Perform explicit isotypic decomposition of the permutation representation of  $S_3$  on  $\mathbb{R}^3$  using projection operators.

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<sup>1</sup>pp.272-273 of [GM]