Lie groups and representations, Fall 2009

Homework #3, due Wednesday, October 7.

1. Write down Young idempotents e_λ for $\lambda = (1^3), (2,1), (3,1), (2^2)$.

2. Classify irreducible representations of S_n that remain irreducible upon restriction to S_{n-1}.

3. The sign representation of S_n is isomorphic to $L_{(1^n)}$. Show that $L_\lambda \otimes L_{(1^n)} \cong L_{\lambda^*}$.

4. For all partitions λ with 4 boxes determine the characters of induced representations I_λ and I_λ^- of S_4 and the multiplicities of irreducible representations in these induced representations. Check that I_λ and I_μ^- have no common summands if $\mu > \lambda^*$ and a single common irreducible summand L_λ if $\mu = \lambda^*$.