

DUE DECEMBER 8, 2016

Problem I (10 pt) : Peskin, Schroeder: Problem 16.1**Problem II** (10 pt)Let T^i be operators which satisfy

$$[T^i, T^j] = i f^{ijk} T^k ,$$

where f^{ijk} are structure constants of a Lie algebra. Let c_i and c_j^\dagger be operators which obey

$$\{c_i, c_j^\dagger\} = \delta_{ij} , \quad \{c_i, c_j\} = \{c_i^\dagger, c_j^\dagger\} = 0 , \quad [c_i, T^j] = [c_i^\dagger, T_j] = 0 .$$

If

$$Q = T^i c_i - \frac{i}{2} f^{ijk} c_i c_j c_k^\dagger$$

show that

$$Q^2 = 0 .$$

Problem III (10 pt) : Peskin, Schroeder: Problem 16.2