Das & Ferbel refers to the textbook “Introduction to Nuclear and Particle Physics”, 2nd Ed, by A. Das and T. Ferbel

Syllabus: Read: Mostly class notes, review Isospin (9.4.4 and 10.5.1)

1. What is the generator of U(1)? (The answer is trivial. Just follow what we did in the class for SO(3) etc.)

2. (Ignore higher order terms, but only when appropriate.) Write the 3x3 (SO(3)) rotation matrices $A_1(\theta_1)$ and $A_2(\theta_2)$ for rotations by small angles $\theta_1$ about the $x$ axis and $\theta_2$ about the $y$ axis, respectively. What are their inverses? (No computation necessary!). Now compute the product $A_2^{-1}A_1^{-1}A_2A_1$ and identify it as a rotation by a certain angle around a certain axis. Point out the connection with the commutator $[L_x, L_y]$.

3. Problem 10.1 (Note: Isospin, an approximate instance of the SU(2) symmetry, was a reading assignment for the previous homework.)

4. Problem 10.4 (do all parts except (f)).