

Mechanics - PHY 6247

HW 4

READ: Chap. 4: p. 134-180

HOMEWORK:

1. Show that the product of two orthogonal matrices is also orthogonal.
2. Show that the trace of a matrix is invariant under any similarity transformation.
3. Show also that the antisymmetry property of a matrix is preserved under an orthogonal similarity transformation.
4. Compute the components of the angular velocity in the space frame in terms of the Euler angles and their time derivatives.
5. Particle 1 is thrown up vertically with initial speed v_0 , reaches a maximum height and falls back to the ground. Particle 2 is dropped at rest from the same maximum height and then falls to the ground. Compute the ratio of the Coriolis deflections of particle 1 and 2.
6. Show that the commutator of the matrix generators of infinitesimal rotation M_1 and M_2 is M_3 .