Physics 237 Problem Set #11

In preparation for the quiz on Thursday, 16 April 2026

D A system is comprised of two spin-1 quanta. Using the upper and lower recursion relations and the sum rule derived in *Lecture 21*, which are

$$\sqrt{j(j+1)-m(m\pm1)}\,\langle j_1 j_2 m_1 m_2 \,|\, j_1 j_2 j, m\pm1\rangle =$$

$$\sqrt{j_1(j_1+1)-m_1(m_1\mp1)}\,\langle j_1 j_2, m_1\mp1, m_2 \,|\, j_1 j_2 j, m\rangle$$

$$+\sqrt{j_2(j_2+1)-m_2(m_2\mp1)}\,\langle j_1 j_2 m_1, m_2\mp1 \,|\, j_1 j_2 j, m\rangle \quad \text{and}$$

$$\sum_{m_1,\, m_2,\, m=m_1+m_2} \langle j_1 j_2 j m \,|\, j_1 j_2 m_1 m_2\rangle^2 = 1 \quad ,$$

calculate all the nonzero Clebsch-Gordan coefficients $\langle j_1 j_2 m_1 m_2 \,|\, j_1 j_2 j m\rangle$, for $j = 2$. (You may call them $C^{j_1 j_2 j}_{m_1 m_2 m}$ as in the textbook, if you like.)

From chapter 5 of Griffiths & Schroeter:

5.2

5.4

5.5

5.6

5.8

