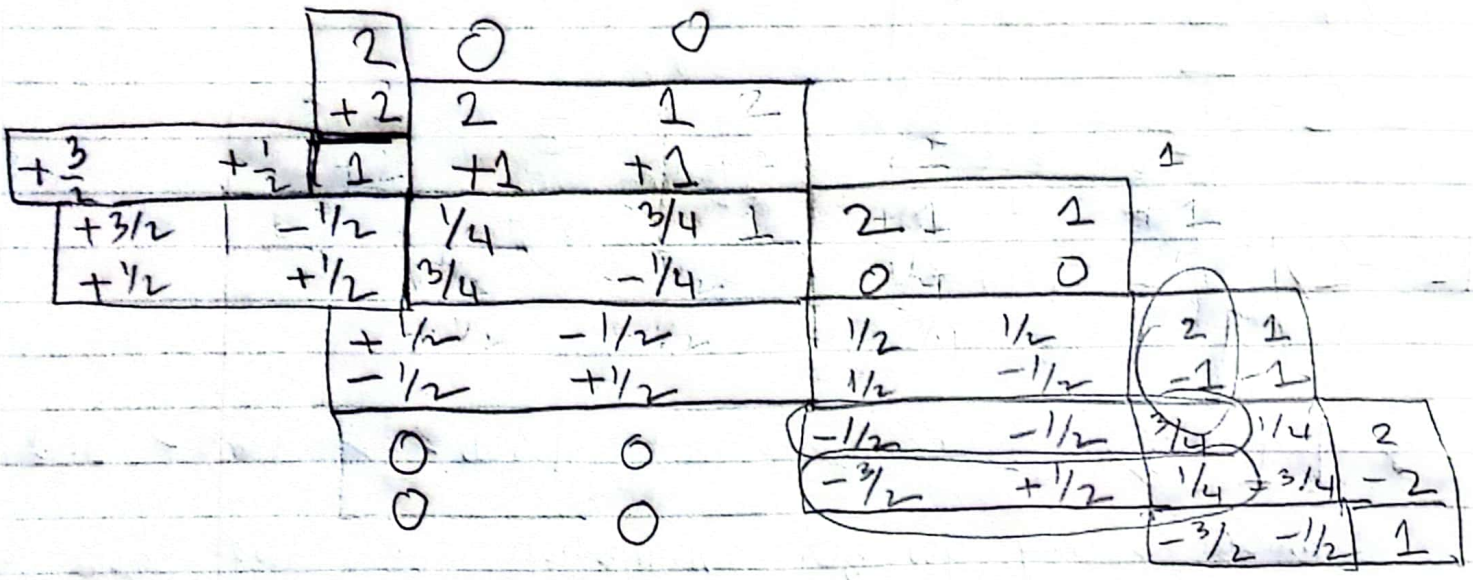
example

$J_1 = 3/2$ $\quad J_2 = 1/2$



$$|2\,2\rangle = \sqrt{1}\left|\tfrac{3}{2}\,\tfrac{3}{2}\quad\tfrac{1}{2}\,\tfrac{1}{2}\right\rangle$$

$$|2\,1\rangle = \tfrac{1}{2}\left|\tfrac{3}{2}\,\tfrac{3}{2}\quad\tfrac{1}{2}\,-\tfrac{1}{2}\right\rangle + \sqrt{\tfrac{3}{4}}\left|\tfrac{3}{2}\,\tfrac{1}{2}\quad\tfrac{1}{2}\,\tfrac{1}{2}\right\rangle$$

$$|2\,-1\rangle = \sqrt{\tfrac{3}{4}}\left|\tfrac{3}{2}\,-\tfrac{1}{2}\quad\tfrac{1}{2}\,-\tfrac{1}{2}\right\rangle + \sqrt{\tfrac{1}{4}}\left|\tfrac{3}{2}\,-\tfrac{3}{2}\quad\tfrac{1}{2}\,\tfrac{1}{2}\right\rangle$$

Note: ANY EMPTY ROWS ARE 0

Derivation of clebsch gordon

Derivations

$j_1 = \frac{1}{2} \qquad j_2 = \frac{1}{2}$

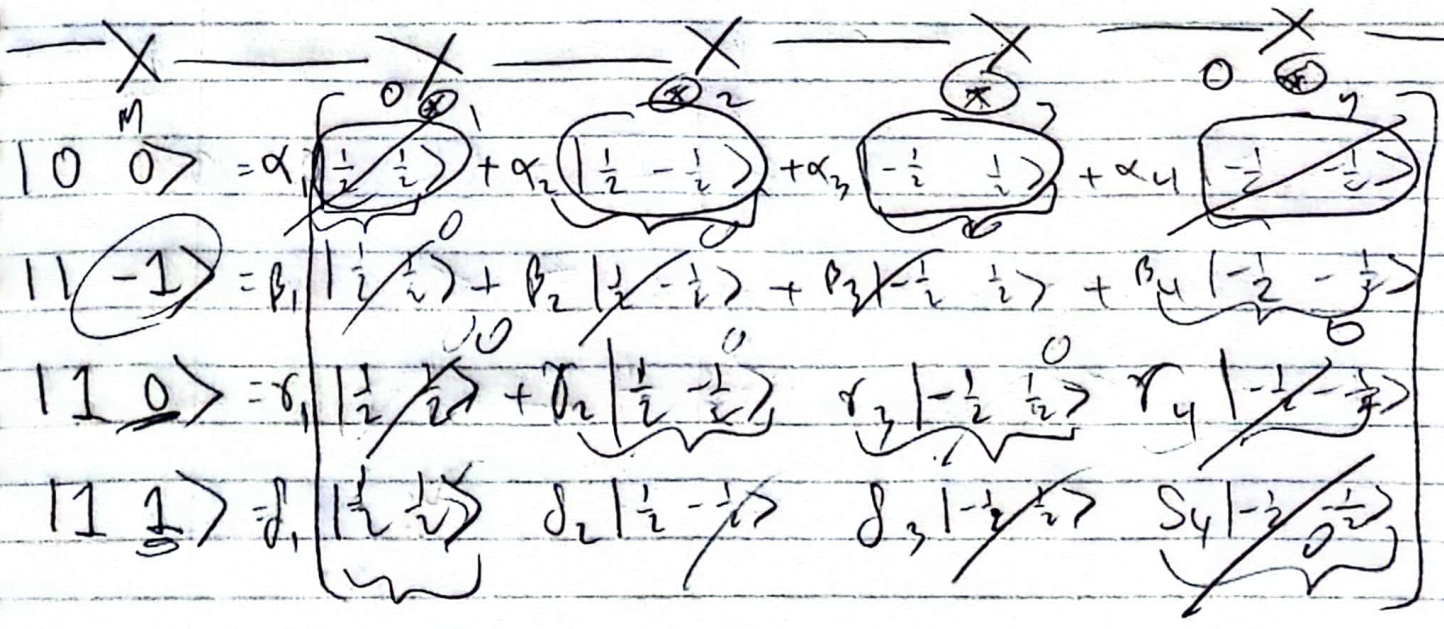
$m_1, m_2 \in \{-\frac{1}{2}, +\frac{1}{2}\}$

$|j_1 - j_2| \leq J \leq j_1 + j_2$

$0 \leq J \leq 1$

$M = \{1, 0, 0, -1\}$

$|1,0\rangle = |\uparrow\downarrow\rangle \;\&\; |\downarrow\uparrow\rangle$



(*)1, (*)2, (*)3, (*)4 stay the same for all possible spin values followed by α, β, γ, δ

[Any Ket notation values which doesn't output the M value